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TO THE AMERICAN PEOPLE:

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We, upon whom has been placed the responsibility of leading the American forces, appeal to you with all possible earnestness to invest in War Bonds to the fullest extent of your capacity.

Give us not only the needed implements of war, but the assurance and backing of a united people so necessary to hasten the victory and speed the return of your fighting men.

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Douglas MacArthur
E. J. King
Dwight D. Eisenhower
C. W. Nimitz
H. H. Arnold

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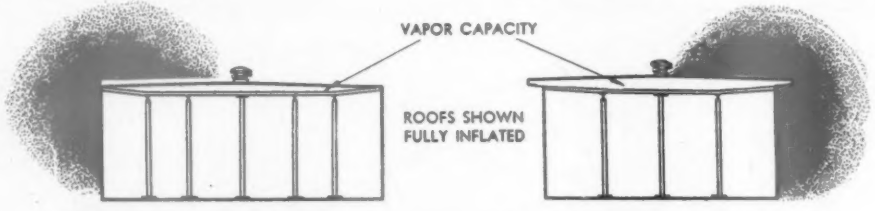
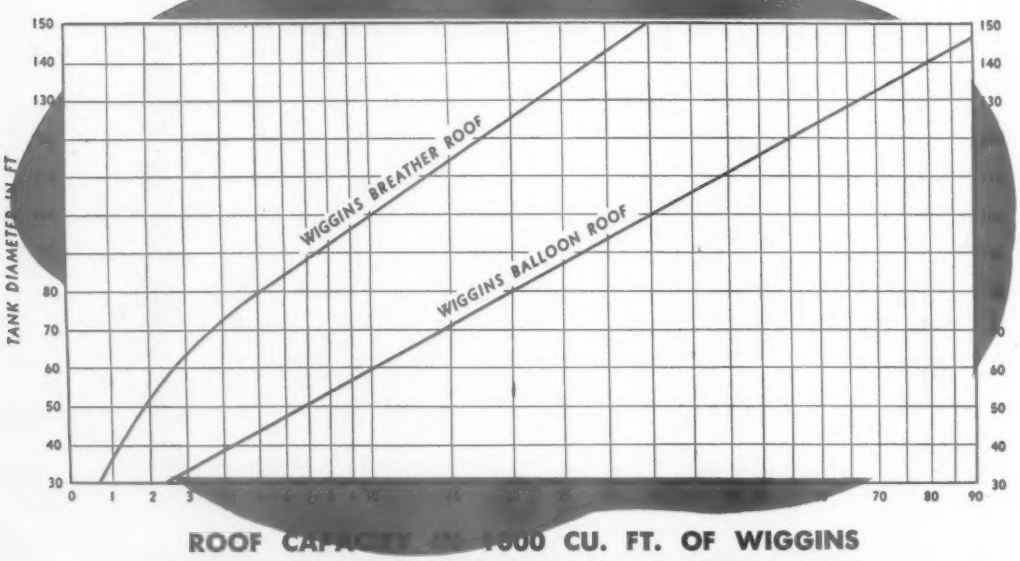


WIGGINS BREATHER ROOF (Type for tanks of all diam...)

WIGGINS BALLOON ROOF (...ype for tanks 60 ft. diam. or less)



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CORROSION RESISTANT • HEAT RESISTANT • COLD RESISTANT

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RESPONSIVE TO HEAT TREATMENT • READILY MACHINABLE

Fort Pitt Stainless Steels have been developed to meet the growing demand for corrosion-resisting steels with higher physical properties. Close analytical control and modern technical methods in one of America's most advanced specialty foundries, assure castings of superior quality in every respect. Customers of the Fort Pitt foundry have the advantage of the combined experience of Fort Pitt metallurgists and Porter process equipment engineers in the solution of their corrosion problems. Send us your blueprints. We will gladly supply an estimate and recommend the proper alloy.

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Trends

Crude-Oil Production
By States—Page 130

CRUDE-OIL STOCKS 222,831,000 bbl. as of May 26, 1945—up 970,000 bbl. One year ago 234,423,000 bbl.

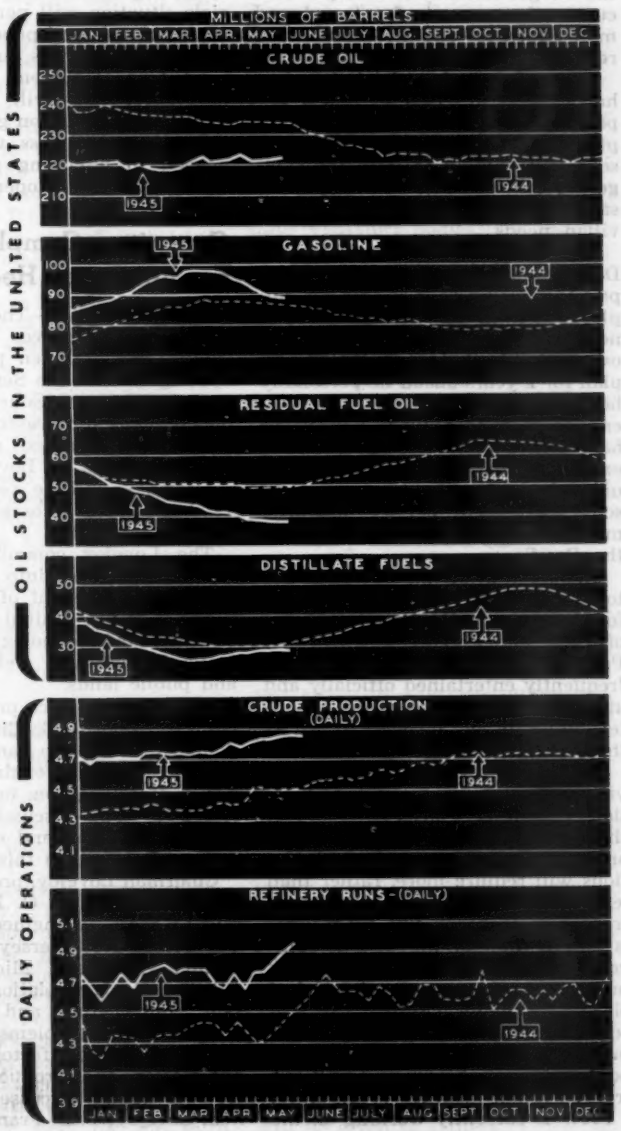
GASOLINE STOCKS 89,121,000 bbl. as of May 26, 1945—down 552,000 bbl. One year ago 86,263,000 bbl.

RESIDUAL FUEL-OIL STOCKS 38,548,000 bbl. as of May 26, 1945—down 76,000 bbl. One year ago 50,617,000 bbl.

GAS OIL AND DISTILLATE STOCKS 29,184,000 bbl. as of May 26, 1945—down 286,000 bbl. One year ago 32,074,000 bbl.

CRUDE OIL PRODUCTION 4,853,050 bbl. as of June 2, 1945—down 15,000 bbl. One year ago 4,528,250 bbl.

REFINERY RUNS 4,950,000 bbl. daily week ended May 26, 1945—up 42,000 bbl. One year ago 4,561,000 bbl.



THE domestic petroleum industry must drill more than 3,000 exploratory wells in the last 6 months if the 1945 program of 5,000 total wildcats is realized. The exploratory drilling pace through the end of May has been 5.5 per cent greater than in 1944, indicating that objectives of Petroleum Administration for War can be realized providing there is no recession of effort on the part of the industry. Of course, the PAW figures actually represent consensus of the industry which has furnished key men in the oil agency. The goal of 5,000 exploratory wells is the result of careful analysis by oil men whose special assignment is to extrapolate wildcat-drilling requirements on the basis of meeting requirements for new production. Approximately 2,000 wildcat completions will have accrued to the industry's exploratory credit by the end of June, leaving three-fifths of the 1945 goal to be accomplished in the last half year.

RENEWED emphasis was directed to the importance of exploratory drilling last week by PAW, which pointed out that more than 40 per cent of the increase in crude-oil production since Pearl Harbor is supplied by fields discovered since December 7, 1941. Fields discovered and developed in the past 3½ years are producing about 400,000 bbl. of crude oil daily. National rate of production is currently 1,000,000 bbl. above the average daily yield in 1941. Most of the prewar fields are producing at or above their maximum efficient rates in order to supply 60 per cent of the increased output required for prosecution of the war.

CONSEQUENTLY, the necessity for fulfilling the exploratory requirements is multiplied in these final months of the war. The industry's record of meeting all calls for petroleum products, regardless of how unreasonable at times, is too spotless to risk default when the knockout punch is most needed. Therefore, it is essential that the industry gear its exploration program over the next 6 months to the objective of completing not only the minimum of 3,000 wildcat wells but at such a level as will provide a reasonable margin of safety for results are unpredictable at best. The military logic of more than enough all the time might well be applied to the industry's exploration program with satisfying results.

PAW Appropriation of Nearly Four Million Reported to House

WASHINGTON.—An appropriation of $3,998,200 to operate Petroleum Administration for War during the fiscal year ending June 30, 1946, is carried in the war-agencies appropriation bill just reported to the House.

The Budget Bureau had estimated that $4,000,000 would be needed by PAW on the basis of war against Japan only during the coming year. The appropriation for the year just ending was $4,950,000. The House appropriations committee explained that the reduction of $31,800 below the budget estimate is a 10 per cent cut in the amounts for travel and mail expenses and it stated in its report:

"The Petroleum Administration has accomplished the seemingly impossible in stretching our oil supplies and finding additional new sources of supply to meet the staggering requirements of war, at the same time meeting minimum civilian needs."

Deputy Administrator Ralph K. Davies told the committee that PAW probably would drop around 125 employes within the next 3 months now that the war with Germany is over. He said that while PAW must plan for 2 years ahead he personally hoped that the war with Japan will end so soon that PAW will never have to have another appropriation, explaining that PAW could be liquidated and its files turned over to some permanent agency within 3 months after the end of fighting in the Pacific.

The committee authorized PAW to spend up to $2,000 of its funds for entertaining foreign oil men and officials, since Davies explained that PAW men on foreign missions are frequently entertained officially and at present they reciprocate by entertaining foreign delegations out of their own pockets.

Davies and a half dozen PAW division directors gave the appropriations committee a brief summary of the world oil situation at present, and declared that the United Nations will require more, rather than less, petroleum products for a one-front war than for two wars. This is chiefly due to the distances involved in Pacific fighting, requiring proportionately more diesel and fuel oil and less motor gasoline. This will require continued maximum crude production and refinery operation both here and abroad, and will tax transportation facilities to the limit.

PAW is currently working on the problem of rehabilitating the French, Italian, and Romanian refineries, and Davies' disclosed that the agency now has 27 men in Germany examining the synthetic oil plants to see if the Germans developed any new techniques during the war.

As to the effect of V-E Day on PAW, Davies told the committee that military requirements for petroleum products are more than 200,000 bbl. per day larger for the Pacific war alone than they have been for both wars, but the PAW staff can be curtailed somewhat because a general easing of the materials situation will permit dropping some controls and paper work, such as drilling permits, installation of marketing equipment, and priority assistance; there will be much less expansion in aviation gasoline refining plants, and less work will be needed in obtaining materials for foreign petroleum operations.

Committee Completes Plans For Resources Hearing

WASHINGTON.—The oil industry committee on sources of petroleum supply, one of seven preparing for hearings before the Senate committee on petroleum resources, has completed plans for presentations by a series of witnesses, according to Chairman John M. Lovejoy.

Hearings will be resumed June 19 before Sen. Joseph C. O'Mahoney's committee.

The Lovejoy committee has divided its subject into four topics: Location and extent of oil and gas reserves in the United States; conservation and technology; factors affecting exploration and production, and public lands.

J. Edgar Pew, vice president, Sun Oil Co.; Monroe G. Cheney, president, Anzac Oil Co., and E. L. DeGolyer, consulting engineer, DeGolyer & MacNaughton, have been selected to lead discussions dealing with the location and extent of oil and gas reserves in this country.

Chairman Lovejoy, president, Seaboard Oil Co.; M. C. Haider, production research engineer, Standard Oil Co. of New Jersey, and J. C. Hunter, president, Mid-Continent Oil and Gas Association, will present conservation and technology procedure and problems.

Tax and price factors affecting exploration and production of petroleum will be discussed by Chairman Lovejoy; F. B. Frank, tax commissioner, Cities Service Oil Co., and Walter S. Hallanan, president, Plymouth Oil Co.

Public Lands in relation to petroleum will be analyzed by A. C. Mattei, president, Honolulu Oil Corp., and witnesses to be selected.

The 19-man industry committee on sources of petroleum supply is one of seven industry committees, representative of all phases of the petroleum industry, selected to develop plans and procedure for industry appearances and presentation of testimony before the special senate committee.

No Improvement in Water Transport in Sight Yet

WASHINGTON. — Adjustments following V-E day offer no immediate prospects of freeing additional water transportation so as to permit increased allotments in South American countries dependent upon tankers for their supply, according to Ralph K. Davies, deputy petroleum administrator.

The petroleum supply and transportation situation continues to be determined by military requirements for high-octane aviation gasoline, high-octane motor gasoline, high-quality diesel oil for both land and marine use, high-grade lubricating oils and special-quality fuel oil for warships of all kinds, Davies said.

The quantity of these requirements calls for the maximum production of the petroleum industry throughout the world. The demand for certain of these products will actually be increased in view of the tremendous distances that ships must cover to supply the military forces in the Pacific.

Treasury Has No Objection To Doughton Resolution

WASHINGTON. — The Treasury Department has informed the House committee on ways and means that it has no objection to enactment of the Doughton resolution reaffirming existing internal revenue regulations on tax treatment of intangible drilling costs.

These regulations were declared illegal by the Circuit Court in New Orleans in the F.H.E. Oil Co. case, though a revised opinion deleted this declaration and confined the application only to the particular well involved in the case.

The resolution in question (House Concurrent Resolution 50) was introduced by Rep. Robert N. Doughton of North Carolina, chairman of the ways and means committee, and simply states that the current regulations conform to the intent of Congress in enacting the tax laws.

At the time of the original de-

cision various bills were introduced to amend the internal revenue code so as to legalize the regulations which were challenged by the Circuit Court, but the fear arose that such legislation might open the way for riders rewriting many sections of the tax laws.

More Members Appointed To Petroleum Committee

WASHINGTON.—Appointment of 11 additional members of the industry's European Petroleum Committee was approved last week by Ralph K. Davies, deputy petroleum administrator. The committee will help in handling petroleum supplies for civilian Europe when the United Nations' military forces relinquish the responsibility and as long thereafter as wartime product and transportation shortages exist.

New members are S. B. Eckert, Philadelphia; J. M. Gardiner, Washington; H. A. Logan, Warren, Pa.; R. W. McDowell, Tulsa; B. H. Morris, Edgewater, N. J.; L. C. Quakenbush, R. E. Ryerson, Joseph Schneider, Edwin A. Theurkeuf, F. H. Hayden, and S. F. Gysin, New York. Alternates: J. A. Lloyd, Philadelphia; G. W. H. Reid, Houston; R. H. Donaldson, R. L. Cleaves, R. G. Sonneborn, P. B. Watson, A. J. Dupont and H. J. Hughes, New York; W. M. Murray, Chicago.

Stripper-Well Subsidy List Is Revised

WASHINGTON. — Additions and changes to the stripper-well subsidy list affecting 24 pools were announced this week by the Office of Price Administration, the revisions effective June 1, 1945, and supplementing pools announced earlier.

Indiana—Half Moon, Posey (high cost) added at 25 cents.

Kansas—McLouth lime, Jefferson (h. c.) at 35 cents; Shallow Water, Scott, 2 cents; Starr, Elk, West Half, (annual basis), 35 cents; Dopita, Rooks (h. c.). 6 cents; Russell (annual), 25 cents; Rocksbury southeast, McPherson (h. c.), 4 cents; Ploog, Rice (h. c.), 35 cents, all added.

Louisiana — Bayou Choctaw and Tambalier Bay pools are both restricted to the Miocene sand.

Michigan—Freeman, Clare, deleted from the list.

New Mexico—Shugart, North, Eddy (annual) added at 20 cents. Empire, Eddy (annual basis, effective December 1) added at 35 cents.

Oklahoma — Hotulke - West Earlsboro, Pottawatomie, combined as a single pool at (h. c.), 20 cents; Tibbens-Tibbens North, Creek (h. c.), 35 cents; Wofford, Seminole at 35 cents; Doyle, 1,200 ft., Stevens, (annual) at 35 cents; Pearsonia, Osage (h. c.) at 11 cents, all added. Bebee, East Pool, corrected to location in Pontotoc and Seminole counties.

Texas—Akard, Jones (annual), 20 cents; Fuhrman - Masco, Andrews, (h. c.), 4 cents; Edwards, Crane (annual), 25 cents, all added.

Wyoming — Dallas and Derby, Freemont (h. c.), at 35 cents; Garland (Madison), Big Horn (h. c.), 35 cents.

Texas Co. to Aid Returning Soldiers in College Work

NEW YORK.—A special leave of absence will be granted to employes of The Texas Co. who return from military service and who desire to take advantage of the Servicemen's Readjustment Act of 1944 (the G.I. Bill) to pursue studies that will benefit them in their future association with the company, it was announced last week by W. S. S. Rodgers, chairman of the board of directors. In addition, financial assistance in the form of loans without interest will be extended to these veterans in cases where the amount available under the law may be inadequate.

The leave is for 1 year, subject to extension at the end of each year, provided the employe is making satisfactory progress in his studies. The educational leave is available to any employe who had at least 4 months' service with Texaco before entering military service.

The employe's benefits under the company's group life insurance, pension and hospitalization plans, will continue as though the employe were in active company service.

Upon the employe's return to company service, full consideration will be given to the knowledge and skill he acquired while on educational leave and to his accumulated seniority with the company, including the period of his leave. More than 5,000 men and women of The Texas Co. are on military leave of absence.

Little Increase in Steel Over First Quarter

WASHINGTON. — Third - quarter allotments of steel for domestic nonmilitary end uses are 330,000 tons greater than for the first quarter of 1945—the last full quarter of the two-front war. This represents an increase of approximately 3.6 per cent above the first-quarter level. For most domestic programs this is not an increase over first-quarter levels. It does, however, include increases in certain programs where the essentiality was clear, including oil-country goods, and trucks.

It is hoped that the supply of carbon and alloy steel for the third quarter will continue at about the same levels as in the two previous quarters — about 14,309,000 tons of carbon and 1,839,000 tons of alloy steel—Lincoln Gordon, program vice chairman and chairman of the requirements committee of War Production Board, said.

Panel Discussion On Gas Features IOC Program

OKLAHOMA CITY.—Earl Foster, secretary of the interstate oil compact commission, this week announced first details of the commission's quarterly meeting to be held in the Biltmore Hotel, Oklahoma City, June 14-16.

Foster declared that "one feature of the meeting receiving widespread interest will come during the last day of open sessions when a forum discussion on 'The Effect of Recent Supreme Court Decisions on the Production and Conservation of Natural Gas' will be conducted by a three-man panel. Sitting on the panel as a representative of the gas industry will be Carl I. Wheat of Washington, D. C.", the secretary said, "and Richard B. McEntire, Topeka, chairman of the Kansas Corporation Commission, will represent state regulatory bodies. The Federal Power Commission has been invited to provide the third man on the panel to represent that body", Foster said.

The commission's second-day sessions will be highlighted by reports of committees and a paper by E. DeGolyer, Dallas, on the "Natural Gas Reserves and Supply in the United States". The first day will be devoted to committee meetings and study sessions, Foster announced.

Industry Assured Its Trained Specialists

WASHINGTON. — Liberalization of deferment policies for men in the 30-37 age bracket virtually assures the oil industry that highly trained specialists in this age group can remain on the job throughout the remainder of the war.

While some points of the Selective Service memorandum to local boards have not been fully interpreted, officials close to the problem feel that the order should solve the hitherto critical problem of specialized personnel over 30 who cannot be deferred through the interagency committee set up to protect a limited number of men 18-29.

The memorandum sent to local boards last week removes the requirement that a man 30 through 33, to be eligible for deferment, be "necessary to" as well as "regularly engaged in" war or war-supporting occupations. Special consideration will be given to fathers.

Plans for World-Wide Oil Role Revealed by Co-op Executive

KANSAS CITY. — Plans for a world-wide role in the oil industry, including active operations in the Middle East, will be laid before members of the International Cooperative Trading Agency by Howard A. Cowden, of Kansas City, president and general manager of Consumers Cooperative Association, at a meeting to be held in London, England, during the week of September 10. Cowden will present a pattern for immediate incorporation of an international cooperative in petroleum.

Shares in the proposed international co-op would be owned by cooperative wholesales here and abroad. The organization would enter into crude-oil production in many countries, presumably including the United States and South America. Reasons for getting a share in the vast resources of the Middle East are indicated in the accompanying table from the Congressional Record, showing the cost of oil from that region delivered at New York compared with the cost of oil from fields in this country delivered at the same point.

The new international organization would own pipe lines and tankers and refineries on a scale large enough to serve its members adequately and efficiently. It would have back of it the tremendous resources of cooperatives, as well as the enormous demand for petroleum products of millions of cooperative members. It may be chartered in the United States or under the laws of some other country.

Events have been moving swiftly in the international cooperative field. A national petroleum cooperative was established recently in Sweden. Shortly after it had been formed, an order was sent to Consumers Cooperative Association for 600 tons of motor oils, which will be shipped to Sweden from the plant at Coffeyville, Kans., owned by the association's refining subsidiary. It is expected the new Swedish petroleum co-op will become a member of the proposed international petroleum association.

Letters expressing a desire to have a part in the global association have come from Canada, South America, Australia, New Zealand, South Africa, Iceland, Turkey, Czechoslovakia, and other countries. Cowden went to the World Security Conference in San Francisco last month and discussed plans for a world petroleum co-op with delegates from various countries.

Cowden, who made his first trip to Europe 11 years ago, is an ardent advocate of two-way trade among cooperatives of all countries. On his second trip to Europe in 1937, he presented outlines of an international petroleum cooperative to International Cooperative Wholesale Society in Paris, France. The second World War prevented action.

He presented the idea again at an international conference in Washington, D. C., in January 1944, attended by representatives of 22 countries.

International Cooperative Trading Agency was established in 1937 with headquarters in London. As its name implies, it serves cooperative wholesales of many countries as importer and exporter, although it is not now handling petroleum products. It and Scandinavian Cooperative Wholesale Society share offices jointly in London and are managed by Einar Mynderup. Consumers Cooperative Association is a member of I.C.T.A. So is National Cooperatives, Inc., Chicago.

COMPETITIVE COST OF MIDDLE EAST AND EAST TEXAS OIL F.O.B. NEW YORK

(Middle East oil via Suez Canal)

	Per bbl.
Middle East	
Production cost	$0.10
Royalty average	.21
Tanker from the Persian Gulf to New York via Suez Canal. Present day, modern tanker, foreign officers and crew	.61
Loading cost	.02
Present tax on imported oil from countries having "friendly nations' contracts"	.10½
Toll charge through Suez Canal	.13
Total out-of-pocket cost	$1.17½
Difference in refinery realization against Arabian oil	.20
Total out-of-pocket competitive cost f.o.b. New York	$1.37½
East Texas	
Market price	$1.25
Gathering charge published rate	.05
Pipe line to Gulf published rate	.10
Loading at Gulf	.02
Tanker to New York. Present day, modern tanker, American crew. Foreign crews cannot operate coastal vessels	.20
Total f.o.b. New York	$1.62

COMPETITIVE VALUE OF MIDDLE EAST AND CALIFORNIA OIL F.O.B. LOS ANGELES REFINERIES

	Per bbl.
Middle East	
Production cost	$0.10
Royalty average	.21
Tanker from the Persian Gulf to Los Angeles refineries. Modern tanker, foreign officers and crew	.61
Loading cost	.02
Present tax on imported oil from countries having "friendly nations' contracts"	.10½
Total out-of-pocket cost	$1.04½
Difference in refinery realization against Arabian oil	.20
Total competitive cost	$1.24½
Kettleman Hills 38 Gravity	
Market price	$1.33
Gathering and pipe-line transportation costs	.17
Total f.o.b. refinery	$1.50

Water-Alcohol Injection for Motor Vehicles Proposed

Application to commercial motor vehicles of the wartime aviation technique of water-alcohol injection to produce greater power from lower-octane fuels is suggested in an article in the June number of Society of Automotive Engineers Journal.

The authors, A. T. Colwell, R. E. Cummings, and D. E. Anderson, all of Thompson Products, Inc., Cleveland, Ohio, describe water-alcohol injection as providing internal cooling, reducing detonation, and enabling the engine to work more nearly at full capacity. They say that the addition to commercial motor vehicles of an auxiliary fuel system supplying alcohol and water by injection through a device attached to the carburetor will make the efficient fuel immediately available when the peak power output is required.

"Best gains are realized when fuel of approximately 12 octane numbers lower than the engine requirement is used", they add. For purposes of injection, it is explained, ordinary drinking water is added to any blend of alcohols used for denaturing purposes, with a 50-50 combination producing the best results.

Development of Invention Is Kettering's Program

NEW YORK.—Dr. Charles F. Kettering, president of General Motors Corp. and chairman of the National Patents Planning Commission, says that as a member of the new committee on patent and antitrust law created by Secretary of Commerce Wallace his policy will be to accord full "encouragement and development" of inventions as the primary means of fostering American industry."

Dr. Kettering emphasized that he will make every effort to draw a distinction between the "problems of patents" and the "problems of the misuse of patents," which is called monopoly.

THIS WEEK

PROGRESS—Motor fuel obtainable from corncobs, oat hulls, peanut shells, Department of Agriculture laboratory announces. . . . Plant for semicommercial production to be built. . . . ¶Commercial future of jet propulsion depends on creation of planes designed to offset high fuel consumption of such power. . . . Application appears limited to short-endurance military craft. . . . ¶Rubber Bureau says trend is away from mixture of synthetic and natural rubber and toward totally synthetic compound. . . . ¶Postwar aircraft may be electrically propelled, aeronautical engineers told. . . . Save weight and power. . . .

PRODUCTION—After hitting new highs for 5 successive weeks, national crude output dropped 15,000 bbl. daily to 4,853,050. . . . Decrease of 16,300 in Kansas too much for scattered increases to overcome. . . . ¶Cuba's new field in Santa Clara Province has 14 wells producing some 450 bbl. daily. . . . ¶First quarter oil output in Bolivia 75,680 bbl. . . . ¶Mexico's government-controlled oil production up slightly in 1944, but exports drop. . . . ¶Argentina's output down. . . .

LITIGATION—Justice Department files suit to determine whether oil under coastal waters is owned by Government or by states. . . . Important properties in California and Texas affected. . . . Both states comment bitterly. . . . Immense school funds involved. . . .

LEGISLATION—Alabama passes bill taxing oil and gas. . . . One well to the 40. . . . ¶Bill providing for petroleum subsidies (production and transportation) passes both houses and referred to conference. . . . ¶Small business committee of House to resume hearings June 12 to find out why OPA hasn't completed probe of oil production and refining costs. . . . ¶Treasury Department gives Congress report on Doughton bill governing deductibility of intangible costs for tax purposes. . . . Approves bill, with certain modifications. . . .

ACHIEVEMENT— Billionth gallon of aviation gasoline produced at New Jersey Standard's Baton Rouge plant. . . . Same record made by California Standard with plants at Richmond and El Segundo. . . . ¶Millionth barrel finished by Sinclair at its Wyoming refinery. . . .

TIRES—OPA announces 2,000,000 passenger-car tires as civilian quota for June. . . . Quota for trucks and buses 164,750, compared with 156,000 for May. . . . No new tires for A motorists for several months. . . American made synthetic tires can "take it" on toughest war fronts, military experts say, following rigid investigations. . . . ¶RRC preparing to handle urgently needed natural rubber from occupied areas in Far East as fast as they are liberated. . . .

REFINING—Five of Belgium's war-damaged refineries to be in operation soon. . . . ¶Inquiry for 1,500,000 bbl. of lubricants for lend-lease reported. . . . Largest in history. . . . Supposedly wanted primarily for relief and reconstruction in Europe and elsewhere. . . .

WAR—Though Japan has suffered terrific losses, she still has important synthetic-oil resources and can wage long war. . . . ¶Eleven additional members appointed to European petroleum committee. . . . To help handle oil supplies for civilians when military forces relinquish control. . . .

International News Photo

The gas one B-29 uses in traveling from the Marianas to Tokyo and return would keep an average motorist in fuel for 10 years. But even more gas is used on special missions, and extra gas tanks are installed for this purpose. One of the extra tanks is here seen being moved across the field

Lt. J. P. Golden and Lt. Comdr. J. W. Malseed

Lt. L. Lowrey and Lt. J. Dimeling, Jr.

Lt. Comdr. Sidney Goldin and Lt. Comdr. W. W. Craig

Navy Relies on Oil Men to Handle Most Fueling Duties

by Henry D. Ralph

IN THE CENTRAL PACIFIC.—If you were an oil man in Navy uniform the chances are that sooner or later you would be assigned to some phase of the job of handling oil for the fleet in the Pacific.

Here you would find yourself in the company of plenty of other cracker-jack oil men from every phase of the business and from every company and area of the United States. In some respects your job would be very much like one in an oil company stateside, but in other respects it would be tremendously different.

Supplying oil to the fleet operating in enemy waters and to bases being carved out of jungle-clad islands is one of the biggest transportation and distribution jobs either the Navy or the oil industry ever tackled.

One of the chief reasons why the job is being done so well is that instead of trying to make oil men out of its regular officers the Navy made officers out of oil men and turned the oil jobs over to them. An oil man walking into a Navy fuel office anywhere in the Pacific would find himself among friends.

This series of articles on the Navy's use of oil in the Pacific would be incomplete without mentioning some of the former industry men met in hurried visits to a number of the forward bases, and a brief description of the kinds of jobs they are doing.

The best berths probably are in the Area Petroleum Office at Pearl Harbor, for these are all desk jobs and the men there constantly have the over-all picture, for the APO is both a planning and an operating agency and is responsible for all the oil supply in the entire Pacific and for all branches of the armed forces.

The area petroleum officer is a career Navy man, Capt. P. D. Lohman, but most of the officers on his staff are directly from the oil industry. A notable exception is Lt. Col. W. J. Worcester, a West Pointer whose chief job is liaison with Army ground and air forces, and who was formerly petroleum officer in the Caribbean.

The executive and planning officer here is Comdr. George C. Shepherd, Jr., who had been a research engineer with Union Oil Co. since 1927 in addition to being a naval reserve officer and graduate of the U. S. Naval War College.

This is the fourth in a series of articles on fueling the Pacific war, by the Journal's Washington editor, following a first-hand observation acting as war correspondent a few weeks ago. Other articles have appeared in the issues of May 19, May 26, and June 2.

Other oil men on the staff of the APO, at the moment, include:

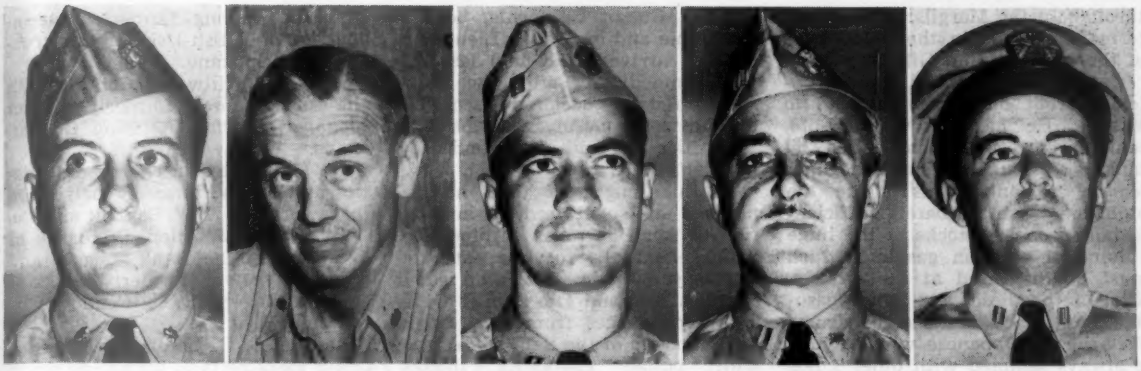
Lt. Comdr. George A. Ritchey, in charge of the bulk section and tanker operations, for 14 years assistant superintendent of the operating division of Atlantic Refining Co., and previously tanker operations officer in the European theater.

Lt. Paul A. Best, leaving shortly to be senior fuel officer on Saipan, formerly with The Texas Co., the Petroleum Administration for War and the War Shipping Administration in Washington and with the Army-Navy Petroleum Board in North Africa and Italy.

Lt. Howard M. Rossell, petroleum products operations officer, for 15 years assistant operating manager of General Petroleum Corp. of California, and formerly fuel officer with Service Squadron Ten during the Marianas campaign.

Lt. (jg) Hollis E. Jones, tanker operations officer, with the Sun Oil Co. for 10 years as assistant plant superintendent in New York, formerly fuel operations officer in the South France campaign.

Lt. Edward M. Winslow, packaged



LT. COMDR. G. RITCHEY LT. COMDR. D. L. McCUEN LT. E. M. WINSLOW LT. H. M. ROSSELL LT. P. A. BEST

LT. D. A. SINGLETON LT. W. J. GRUMM LT. (JG) H. E. JONES LT. (JG) R. W. BALDWIN ENS. J. B. WEST

products officer, with the Sun Oil Co. for 16 years as office and credit manager, formerly assistant fuel officer in the South Pacific.

Lt. (jg) Richard W. Baldwin, for 15 years with the Shell Oil Co. in the operations department at Boston, formerly supply and tanker coordinating officer of the Army-Navy Petroleum Board in Washington, and just leaving to become staff petroleum operations officer in the Marianas.

Ens. Joseph B. West, formerly junior engineer with Eastern States Petroleum Co. of Houston, soon to be packaged products officer for the Marianas.

Storekeeper, First Class, Carl J. Laskow, assistant in the tanker operations division, for 19 years with the Shell Oil Co. in the shipping and traffic department at Wilmington, Calif.

At every naval base or other installation there is a fuel officer, and nine times out of ten he is straight from the oil industry. Typical is the setup in the 14th Naval District, which includes Pearl Harbor and other establishments in Hawaii. The petroleum coordinator there is Rear Adm. John J. Gaffney, a regular Navy man, who is also supply officer for the 14th District and commandant of the Naval Supply Depot, Pearl Harbor.

The real job of coordinating the oil requirements and supplies of all the military posts and installations in the Hawaiian area is done by the deputy fuel coordinator, Lt. D. A. Singleton, formerly assistant to the manager of the eastern division of Valvoline Oil Co., Edgewater, N. J.

When oil enters or leaves the Hawaiian area—and a lot of it does every day—it is handled by the fuel annex of the Naval Supply Depot, which is in charge of Lt. Comdr. J. W. Malseed, formerly manager of the Shell Oil Co.'s Wilmington, Calif., marine terminal, and Lt. J. P. Golden, formerly sales representative of The Texas Co. They operate the annex just like a huge commercial oil terminal, which is what it really is, with docks, pipe lines to various installations, tank farms and underground storage, truck loading racks, and drum filling plants.

Other oil men doing oil jobs in Hawaii include:

Lt. A. J. Young, Ewa Junction drum storage area, formerly with the Frontier Fuel Oil Corp., Buffalo.

Lt. Comdr. John H. Koehler, NSD, Pearl Harbor, formerly with Gulf Oil Corp.

Pay Clerk C. H. LaFlamme, NSD, Pearl Harbor, formerly with Standard Oil Co. of California at San Pedro.

Lt. (jg) C. E. Morse, naval air station, Hahului, formerly with Richfield Oil Co., Inc.

Lt. (jg) J. W. Shugart, naval air station, Barber's Point, formerly with Southwestern Petroleum Co., Inc., Fort Worth.

Lt. (jg.) Z. P. Armstrong, NSD, Pearl Harbor, formerly with Henderson Properties, Corpus Christi.

Lt. (jg.) J. M. Sprague, naval air station, Honolulu, formerly with The Carter Oil Co., Tulsa.

Pay Clerk J. W. Seitz, NSD, Pearl Harbor, formerly with Atlantic Refining Co.

Lt. R. W. Reeves, 14th District supply office, formerly with Gulf Oil Corp.

Pay Clerk W. E. Richardson, NSD, Pearl Harbor, formerly with Shell Oil Co., Martinez, Calif.

Lt. J. E. Lyon, Jr., naval air station, Kaneohe, formerly with Quaker State Oil Co., Atlanta, Ga.

One of the most active and most exasperating oil jobs in the Pacific is that of Lt. Comdr. Richard H. Pence, Fuel Officer on the tiny coral island of Kwajelein. Once the scene of bitter fighting and later the staging area and fleet base for other operations, Kwajelein is important now chiefly as a stop for very heavy trans-Pacific air traffic and as a fuel and supply port for ships of all kinds. Commander Pence is responsible for fuel supplies

throughout the Margils, as the Navy terms the atolls in the broad area of the Marshall and Gilbert islands.

Commander Pence's worst problem is that he has practically no storage. He has a few 1,000-bbl. tanks ashore which are filled by tankers through submarine lines leading to anchorages inside the atoll, but these are barely sufficient to hold working stocks of the huge volume of aviation gasoline which must be dispensed at the airstrip. Most of the diesel and motor gasoline has to be handled in drums over the old Japanese wharf which is always jammed with other kinds of freight.

Floating Storage

The floating storage in the Margils consists in large part of craft that are not considered good enough to use in the forward area, such as old concrete barges and small, barnacle-encrusted merchant tankers barely able to move under their own steam. There are also some Liberty ships converted into tankers which are used chiefly for interisland shipments in the area, and a number of "Yard Oilers", small Navy tankers used to fuel ships in the harbor.

On a land-mass island, such as the Marianas, Philippines, or — soon — Okinawa, the jobs of the fuel officers are not quite so difficult after the initial stages of the occupation. This is because there is room to work, space for tank farms and shore installations, and intent to remain long enough to justify construction work.

On Guam, for example, there is quite a colony of Navy oil men with rather complete division of labor among them, and as soon as all the planned construction work is finished the job will be as smooth and routine as at Pearl Harbor.

Guam is the administrative center for all the Marianas, Iwo Jima, and the western Carolines, and the fuel supplies and requirements for these areas are coordinated and supervised by Lt. Comdr. D. L. McCuen, the forward areas representative of the APO in Pearl Harbor. McCuen was formerly in Mexico with the old Pan American Petroleum & Transport Co. and then in the industrial products department of Tide Water Associated Oil Co. in New York, and has been in the Navy 2½ years, having served as petroleum officer in South America and the West Indies.

All operations come under the fuel office of the Guam Naval Supply Depot, which is headed by Lt. Comdr. Sidney Goldin, formerly assistant manager of the New York division, Shell Oil Co., Inc.

The installations were built, of course, by the versatile Seabees, and all the planning and construction was supervised by Lt. W. J. Grumm, formerly an engineer with Standard Oil Co. of California, both in California and in Arabia. Lieutenant Grumm arrived on Guam last August, immediately after the island was officially declared "secured", and he works closely with the NSD fuel office and with the island commander's staff.

In this length of time he has planned and supervised the installation of some 50 miles of pipe line, which eventually may be extended to nearly 100 miles—all on an island 30 miles long and 4 to 8 miles wide. This pipe ranges from 4 to 12 in. and is mostly of the light spiral type with bolted couplings, though heavy steel pipe is used for submarine lines, along docks, and under roads or other places where the lines must be buried. Bulk storage has been built for about 1,000,000 bbl., and the tank farms are still growing. Most of the tanks are either 1,000 or 10,000-bbl. capacity of the "quick-up" bolted type, though there are two 60,000 and one 80,000-bbl. riveted tanks for black oil. A modern testing laboratory is under construction to make sure that the products have not been contaminated en route and are up to specification before being issued.

Tank Farms on Guam

There are 15 tank farms on Guam interconnected with 50 miles of pipe line and maintained by 18 booster stations, and the system is still growing. In addition there are some 2½ square miles of storage area for drummed products and several warehouses issuing greases and other specialties in small containers. The Army Air Force B-29 units, as well as all other Army, Navy, Marine and Coast Guard outfits based on Guam, are supplied by the fuel office, and it is also responsible for fueling fleet units which come to the harbor. Ships are fueled from dock-side pipe lines, barges, and self-propelled oilers.

Up to the middle of April the Guam fuel office had handled in excess of 800,000 bbl. of fuel oil, 600,000 bbl. of diesel, 800,000 bbl. of aviation gasoline, and 200,000 bbl. of motor gasoline, or more than 2,500,000 bbl. of bulk products, plus nearly 500,000 drums of products and more than 2,500,000 lb. of grease. The volume of all products handled is increasing steadily, and plans for future operations call for doubling or tripling current facilities and activity.

An operation of this sort requires experienced oil men, and, as is to be expected, the Guam fuel office is full of them. Currently Commander Goldin's staff includes:

Lt. Comdr. W. W. Craig, in charge of petroleum testing, formerly chemical engineer with Gulf Oil Corp., refining and technology division.

Lieut. J. Dimeling, Jr., in charge of harbor fueling, formerly superintendent of Walsh-Driscoll Construction Co., Spokane.

Lt. L. C. Gilworth, liaison with the service force, formerly district manager, Sinclair Refining Co., St. Louis.

Lt. L. Lowrey, in charge of logistics and safety, formerly petroleum inspector with E. W. Saybolt and Co.

Lt. (jg) J. M. Allen, in charge of aviation-gasoline tank farms and pipe-line system, formerly assistant store manager, J. C. Penney Co., Laramie, Wyo.

Lt. (jg) E. B. Snell, in charge of motor gasoline tank farms and drum storage, formerly manager of Boulevard Supply Co., Russell, Kans.

Lt. (jg) R. J. Griffith, assistant testing officer, formerly chemical engineer with Sun Oil Co., Toledo.

Pay Clerk F. P. Beall, in charge of waterfront bunkering, formerly chief gager for Humble Oil and Refining Co., Houston.

Pay Clerk W. S. Ferris, assistant officer in charge of drum storage, formerly office manager for Loffland Bros. Co., Tulsa.

American Vehicles, Tires Meet War's Tough Tests

DETROIT. — American-made motor vehicles and synthetic tires are meeting the supreme tests of war, according to military experts who reported at a war-material meeting of the Detroit section, Society of Automotive Engineers, here June 4. These experts, all of the Office of the Chief of Ordnance, Detroit, sent to various combat theaters to make thorough investigations, said that the vitally important 6.00-16, 7.50-20 and 9.00-16 synthetic tires have proved completely adequate in the western European and Italian theaters. Maj. J. J. Robson reported that the larger sizes of synthetic tires still need improvements to prevent failures from overloading, high speeds, and long-distance travel.

Postwar Aircraft May Be Electrically Propelled

KANSAS CITY. — Electric-powered airplanes are among postwar possibilities, Austin F. Trumbull, United Airlines representative with Douglas Aircraft Co., Santa Monica, Calif., told air transport engineers meeting here June 7 under the auspices of Society of Automotive Engineers. Trumbull said manufacturing costs are being estimated and that preliminary engineering investigations suggest that such planes, powered by turbine-driven electric motors, might incorporate substantial savings in weight and power because of reduced drag and more efficient propeller location.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Future of Pipe Lines

CONCLUSION of the war in Europe has enabled many within and outside the petroleum industry to appreciate fully for the first time the vital part that pipe lines played in winning that phase of the global conflict. Furthermore, if pipe-line facilities are permitted to keep pace with postwar needs, they will expand during the next several years as never before.

As one ranking Allied officer has stated, pipe lines are now definitely a part of military equipment in exactly the same sense as trucks and other motorized transportation units. Portable lines have backed up rapidly advancing Allied armies whose offensives, except for those transportation arteries, would have been slowed down at critical periods. In the Far East the industry's longest single line has given remote Allied armies the fuel needed to make them effective military forces.

In this country the Army, the Navy and the war-agency heads are in agreement that domestic pipe lines on several occasions represented the difference between tragic delays and the maintenance of military schedules. It was feared by many that the Big-Inch and Little Big-Inch lines might fail just when they were most needed. It is a tribute to those who designed and laid them that the two lines, for which there were no prewar precedents, have consistently surpassed capacity ratings. Rail and water shipments were often disrupted by storms, but these two large systems and smaller lines without interruption exceeded shipping schedules to the East Coast.

Great progress has been made also in operating techniques. Outstanding has been the batch shipment of practically all light and heavy products, including 100-octane fuel and the carefully processed components from which it is blended. All this has been accomplished with a small fraction of the materials and manpower required to build and operate other types of petroleum transportation.

From the long-range viewpoint the war has greatly broadened the possibilities of pipe lines in serving peacetime economies everywhere. Underground transportation and storage will be a part of all defense plans of the future. Development of known or probable oil structures, no matter how remote, will be delayed no longer because of lack of economical transportation.

In distribution we now know that a vast network of product pipe lines connecting small as well as large centers of consumption is entirely feasible.

In this country we still have the hurdle of returning all pipe-line systems to private ownership and management. The emergency has widened the possibilities of future applications, but has brought dislocations through the construction of lines designed solely to serve the war effort.

The operators, if permitted to do so, can work out these problems of transition from war to normal conditions. Competent operating heads are now engaged in studies from which sound programs will evolve.

The principal contributions that government can make are equitable tax laws and a reversal of certain prewar policies which culminated in the consent decree, still a cloud overhanging the future of pipe-line transportation. A friendly and cooperative governmental attitude will pay still greater dividends to consumers and will strengthen the nation's basic defenses.

INTERNATIONAL

Venezuelan Production Up 36.2 Per Cent

TOTAL Venezuelan production for te first 3 months this year averaged 771,252 bbl. daily, an increase over the same period last year of 36.2 per cent. This figure was disclosed in New York last week by Arthur T. Proudfit, president of Creole Petroleum Corp., reporting to stockholders on 1944 and first-quarter-of-1945 operations.

"Creole's average daily net production," Proudfit reported, "plus purchased royalty oil, was 50.5 per cent of the Venezuelan total in the first quarter. On the basis of past experience, this is a more nearly normal share of total production than the 53.1 per cent which we had in the entire year of 1944.

"Our objective for the balance of the year is to build up a potential that will continue to meet demand as indicated by the United States Petroleum Administration for War. Present Creole-operated potential is 518,000 bbl. a day, and if we achieve the present target program, we will increase this to more than 550,000 bbl. a day by the end of the year. We, of course, cannot say what our daily production will be for the year, since our production will depend upon the actual demand and the transportation situation.

"Present Venezuelan potential, as best we can estimate it, is more than 900,000 bbl. a day. Assuming there is no change in present objectives total potential for Venezuela may exceed 1,000,000 bbl. a day by the beginning of 1946.

Intensive Development Drilling Program

"We are continuing to pursue our intensive program of development drilling, and in the first 3 months 46 wells were completed by Creole and partners on proven acreage owned by Creole or in which Creole has an interest. Only one of these was dry. Creole and partners drilled 196 development wells in all of 1944, so our rate for the first quarter is very close to that of the previous year.

"Because of indications that demand for medium gravity crude oil from the Lake fields will increase, we are concentrating all available drilling rigs in that area on the development drilling of proven medium oil acreage during the second and third quarters of the year. This must be done at a temporary sacrifice of exploratory drilling.

"In eastern Venezuela we are continuing an intensive effort to increase light-oil production in the Jusepin and Mulata fields.

Exploration Is Pushed

"Exploration in the first quarter was pushed at a faster rate than in 1944. In that period we and partners drilled nine wells, or one-third of the exploratory wells drilled in all of last year. It will not be possible to maintain this rate, due to the elimination of exploratory drilling in the Lake fields for the second and third quarters. We will, however, continue our intensive exploratory effort in the East.

"Four of the nine exploratory wells were producers. Of the five which were dry, two were deep tests in the Jusepin field. Here I might mention that further drilling to obtain production from the deeper sands at Jusepin has not borne out our earlier expectations. About this time last year we had drilled four productive wells to this deeper horizon, and Mr. Lieb reported to the annual meeting that the effective sand thickness in some of these wells was such as to lead us to expect a very substantial addition to our productive area. Since then, additional drilling has delineated the productive area in all directions, the proved area being about ⅓ of a mile wide on an average and 3 miles long. It covers only about 655 acres and is now producing about 10,000 bbl. a day."

Argentine Oil Production Registers Slight Drop

Argentina's total oil production in 1944 was 3,852,088 cu. m., compared with 3,948,412 in 1943, a decline of 96,324, according to official figures. Of the total 2,576,369 cu. m. was produced by the state oil fields and 1,275,719 by private companies. Acute shortages of drilling and field equipment made opening up of new fields difficult.

Preliminary estimates place Argentine crude-petroleum imports during 1944 at 145,268 tons; fuel and diesel oil, 318,000; kerosene, 5,670; lubricants, 3,879. Estimated imports of crude fuel and diesel oil increased 9 per cent over 1943, but decreases of approximately 400 per cent in kerosene and 9 per cent in lubricants were registered. Moreover, the increase for fuel and diesel oil did not materially improve the domestic supply situation, since the greater part of these products was imported under commitment to the railroads and several steamship lines.

The extreme drop in kerosene imports caused for private consumers one of the most severe wartime shortages in the Argentine. The decrease in the supply of lubricants was also greatly felt by the consuming public.

Deliveries for consumption of all petroleum products during the year are estimated at 23,100,000 bbl., a slight increase over the 22,700,000 registered for 1943. The 1944 figure, however, is still well below the normal annual average of 30,000,000 bbl.

Severe restrictions in the availability of fuel oil have necessitated use of such substitute fuels as maize, wheat, linseed, firewood and charcoal. Fuel rationing began in 1942 and was extended drastically in March 1944 with private automobiles limited to 140 l. per quarter. The quotas were graded upward through different categories of users to 1,100 l. per quarter for taxicabs in the federal district. Black marketing was discouraged by the Government's decision to sell all motor gasoline in two colors; blue for automobiles and motorcycles and yellow for other vehicles. Penalties were provided for the improper sale and use of the colored gasoline and for mixing the two types.

Cuba's Newest Field Contains 14 Producers

Cuba's Jarahueca field, Santa Clara Province, is currently producing between 400 and 500 bbl. daily from serpentine which is found at depths varying down to 1,800 ft. The field, it is reported in special dispatches to the Journal, contains 14 completed producing wells. The pool was discovered in the fall of 1944. The only other producing field in Cuba is Motembo which has been a commercial operation for several years and is rapidly reaching depletion.

First-Quarter Oil Output In Bolivia 75,680 Bbl.

Crude-oil production in Bolivia during the first quarter of 1945 totaled 75,680 bbl., of which 40,985 bbl. was processed at the Camiri and Sanandita refineries. Delivery of gasoline and kerosene from the two refineries to consuming centers is expected to be greatly facilitated by the arrival of 30 new trucks from the United States. The trucks are stated by the Bolivian press to be a part of the 100 ordered by the government.

Brown Scores State Department's Concept of Conservation

WASHINGTON.—Fear that domestic crude-oil producers will suffer by the State Department's concept of conservation was expressed by Russell B. Brown, counsel of the Independent Petroleum Association of America, testifying before the Senate finance committee in opposition to the bill to extend the reciprocal trade agreements program.

This measure, which has already passed the House, would not only continue the authority for the State Department to negotiate agreements with other countries reducing U. S. duties on specified imports but would also permit a further reduction of 50 per cent in duties which have already been reduced by earlier agreements.

"The independent producing industry," Brown told the committee, "has already been injured by reciprocal trade agreements. We now face a far greater menace from abroad than at any time in our history. Producing capacity already established in foreign countries is great enough when added to normal domestic production to wreck the domestic producing industry.

"Foreign oil is produced through wells of greater volume and at less expense than our own. Our domestic oil-producing industry cannot long survive such competition; cannot further continue the conservation program in the United States, and cannot maintain American wage standards."

The State Department, Brown said, takes the position that public interest requires maximum conservation of domestic reserves and large-scale expansion of foreign reserves by United States nationals, but he insisted that the department's concept of conservation is really "reservation" of oil in the ground.

He also declared that American consumers have not benefited by the reduction in the crude-oil import tax made in the trade agreement with Venezuela and neither did the people of Venezuela or other exporting countries, but that the entire benefit went to large American companies with extensive foreign crude production.

In support of his contention that the State Department's stand, if adopted, would be of chief benefit to major companies, he submitted Venezuela's production figures, as shown in Table 1.

Federal Suit Clouds State Ownership of Tideland Pools

LOS ANGELES. — The status of submerged coastal lands in California is expected to be determined by a test case filed by the Department of Justice in U. S. District Court here against Pacific Western Oil Co. The suit may establish a precedent for similar action in other states, especially Texas, where the state public school fund is threatened.

Specifically the suit petitions the court to eject Pacific Western from a lease on 144.07 acres, granted by the state and asks that the company be prohibited from further production of oil and gas. California will contest the suit as it is the real defendant. The federal Government cannot sue the state except by original action in the U. S. Supreme Court and the first step will be to ask for dismissal of the action in the Federal Court on this ground. The interest of the state lies in the fact it may lose $5,000,000 annually which it receives in royalties from various tideland properties.

Though directed at only one operator in the Elwood field of Santa Barbara County, the suits affects submerged reservoirs at Rincon, Goleta, Wilmington and Huntington Beach. There is some question, especially at Wilmington, whether any decision in the present suit would be applicable. Involved in the Wilmington field would be ship channels, reclaimed lands and other conditions that might not be involved in the pleadings.

The suit did not come as a surprise. Many operators, legislators and attorneys have been expecting civil action for years. Some of the operators with leases obtained from the state have taken the precaution of applying for leases from the federal Government also. It is likely the present suit will prevent any further leases by the state unless the operator can get an extension of contractural obligations until after decision has been given.

The suit comes at a time when operators were contemplating leases on additional tideland acreage in an effort to increase crude-oil production as a war measure.

Fields that might ultimately be affected contain about 2,000 acres of productive tideland property and there is a possibility that an additional 5,000 acres might ultimately be found productive. The House judiciary committee will begin hearings on June 18 on legislation to establish title to all United States tidelands and hearing on a resolution of Sen. Pat McCarran of Nevada, which proposes that the United States quitclaim its rights to such deposits, will start about June 11.

The implication in connection with the filing of this suit is that eventually the federal Government will move to take jurisdiction over all lakes and rivers. In that event, the Government will have to take action

Congress May Nullify Suit for Tidelands

WASHINGTON.—The House judiciary committee has scheduled hearings beginning June 18 on a group of 17 virtually identical resolutions declaring that the federal Government has no claim to title to submerged lands beneath the ocean between the low-tide mark and the international limit.

Should such legislation be passed speedily it would nullify the suit filed in Los Angeles by the Department of Justice last week against Pacific Western Oil Corp. to invalidate a California state lease under which the company is producing oil from the ocean bed at Elwood field near Santa Barbara.

TABLE 1—PRODUCTION OF CRUDE PETROLEUM IN VENEZUELA BY COMPANIES FOR THE YEAR 1944

Company—	American affiliate or parent company	Barrels*	Per cent of total
Creole Petroleum Corp.	Standard Oil Co. (N.J.)	141,002,969	54.86
The Venezuelan Oil Concessions, Ltd.	Shell Oil Co., Inc.	45,502,585	17.70
Mene Grande Oil Co.	Gulf Oil Corp.	39,432,918	15.34
Caribbean Petroleum Co.	Shell Oil Co., Inc.	11,700,698	4.55
Compania Consolidada de Petroleo	Sinclair Oil Co.	10,619,610	4.13
Colon Development Co., Ltd.	Shell Oil Co., Inc.	7,076,496	2.75
Socony-Vacuum Oil Co.	Socony-Vacuum Oil Co.	1,027,409	0.40
Central Area Exploitation Co.	(British)	289,252	0.11
Texas Petroleum Co.	The Texas Co.	177,673	0.07
British Controlled Oil Fields, Ltd.	(British)	168,535	0.07
Orinoco Oil Co.	Pure Oil Co.	18,723	0.01
S. A. Petrolera Los Mercedes	The Texas Co.	528	....
Total		257,017,396	100.

Other American companies holding oil interests in Venezuela are: Standard Oil Co. of California, Sun Oil Co., The Atlantic Refining Co., and Union Oil Co. of California.
*Converted from cubic meters as reported by Venezuelan Government.

against California as the state has leased subsurface development rights beneath the Sacramento River to an oil operator. This property now yields royalties to the State on the production of gas in the Rio Vista field.

Anticipating federal action, the California legislature adopted a resolution on March 15, 1945, reaffirming its claim to all tidelands within its boundaries.

Giles Calls It "Unwarranted Attack Upon State's Rights"

AUSTIN.—The Government's suit against Pacific Western Oil Corp. is designated by Bascom Giles, Texas land commissioner, "another unwarranted attack upon the state's rights by the federal Government," and a threat to the state public school fund.

Giles said Texas claims 3,250,000 acres of land along its Gulf Coast and a million acres of riverbed lands, including oil and gas property estimated at a value of more than $150,000,000.

Texas' seaward boundary extends 10.36 miles from the shore line and was fixed by the first congress of the republic and further attested by both the Congress of the United States and Congress of Texas when Texas joined the union.

"It is difficult for me to conceive of any legal basis for contending the United States has any title to the submerged land abutting upon the coast of any sovereign state of the United States, but more specially the sovereign state of Texas," said Giles.

There's Oil for All Rubber Needs, Says Bruce Brown

There is enough oil available to make all the rubber this country is likely to need after the war, and the quantity "could hardly be noticed," says Bruce K. Brown, general manager of research and development for Standard Oil Co. of Indiana, in Chemical and Engineering News, publication of American Chemical Society.

Existing low-cost synthetic rubber component plants could produce about 558,000 long tons of synthetic rubber annually by using only 2 days yearly of the peacetime demand for petroleum, Brown points out. Such production of rubber, he explains, would require annually about 7,200,000 bbl. of certain petroleum products, but the United States refined and used about 3,500,000 bbl. daily of petroleum in prewar years.

"The 558,000 long tons per year of synthetic rubber which might thus be supplied represent about the amount of natural rubber used in prosperous prewar years."

Even synthetic-rubber manufacture of 1,000,000 tons a year, using petroleum, would be a "very small factor" in draining American petroleum reserves, Brown says.

Fish Accepts War Department Assignment

WASHINGTON. — Lounsbury S. Fish, organization counsel for Standard Oil Co. of California, has gone to Germany on a War Department assignment having to do with organizational planning in the occupied territory.

In requesting Fish's services, the War Department described him as "one of the best qualified men in the country to develop this type of organizational planning." He has worked with War Production Board and Petroleum Administration for War, where he was active in the early development of both agencies.

Coauthor of "Top Management Organization and Control," his home is in Palo Alto, Calif.

DEATHS

Will King Holmes, 64, superintendent of the Tulsa refinery of The Texas Co., died unexpectedly June 4. Holmes, who joined Texas as a laborer in 1907, advanced steadily and in 1931 was elected vice president of The California Texas Co., with headquarters in Los Angeles. For 5 years previously he had been superintendent of the Texas plant at Port Arthur, Tex.

Theodore H. Ellis, 78, retired civil engineer who devoted his professional career largely to construction and operation of oil refineries, died May 26 in Summit, N. J. Many of the fuel-oil stations serving the Navy around the world are of his design and construction, built while he was consulting engineer for U. S. Shipping Board.

A. J. Clark, 63, general superintendent of Coastal Petroleum Co., died this week at Dickson, Tex.

Edwin D. Watkins, 95, for 65 years active in oil and natural-gas developments in the region of Lima, N. Y., died May 26 in Rochester, N. Y. In recent years he had extended his oil interests to Kentucky.

Harold Broadstone, 41, drilling superintendent for Loffland Brothers Co., died in Houston May 28 of injuries suffered in an automobile accident.

Dr. Charles T. Kirk, retired geologist and author, died June 1 in Tulsa. Educated at University of Oklahoma and University of Wisconsin, he became an instructor in geology at Montana School of Mines and University of New Mexico. He made several surveys of oil and mining lands in this country and South America.

William E. Noble, for 25 years district manager for Atlantic Refining Co. in Oil City, Pa., died May 30 in Syracuse, N. Y.

Elmer Gatewood, 52, independent oil operator, died May 31 in Jackson, Miss. He was engaged in the oil business in Wichita Falls, Tex., before moving to Jackson 3 years ago.

Loyal W. Trumbull, 67, who died recently in Denver, graduated from Colorado School of Mines in 1904, became professor of mining and geology at University of Wyoming in 1908, and was Wyoming state geologist from 1913 to 1925, when he retired on account of ill health.

Charles W. Olesen, 51, equipment engineer for Stanolind Oil & Gas Co., Tulsa, died June 3 of a heart attack. He graduated from Massachusetts Institute of Technology and was a lieutenant in the first World War.

Steve P. Redfearn, Wichita, Kans., engineer and safety director for Globe Oil & Refining Co., died May 29 of injuries suffered when he was struck by a train near Lemont, Ill., while supervising the laying of a pipe line paralleling the railroad tracks.

Virgil S. Barrett, 83, throughout almost his entire adult life a producer in the Bradford oil fields, died June 1 in Bradford, Pa.

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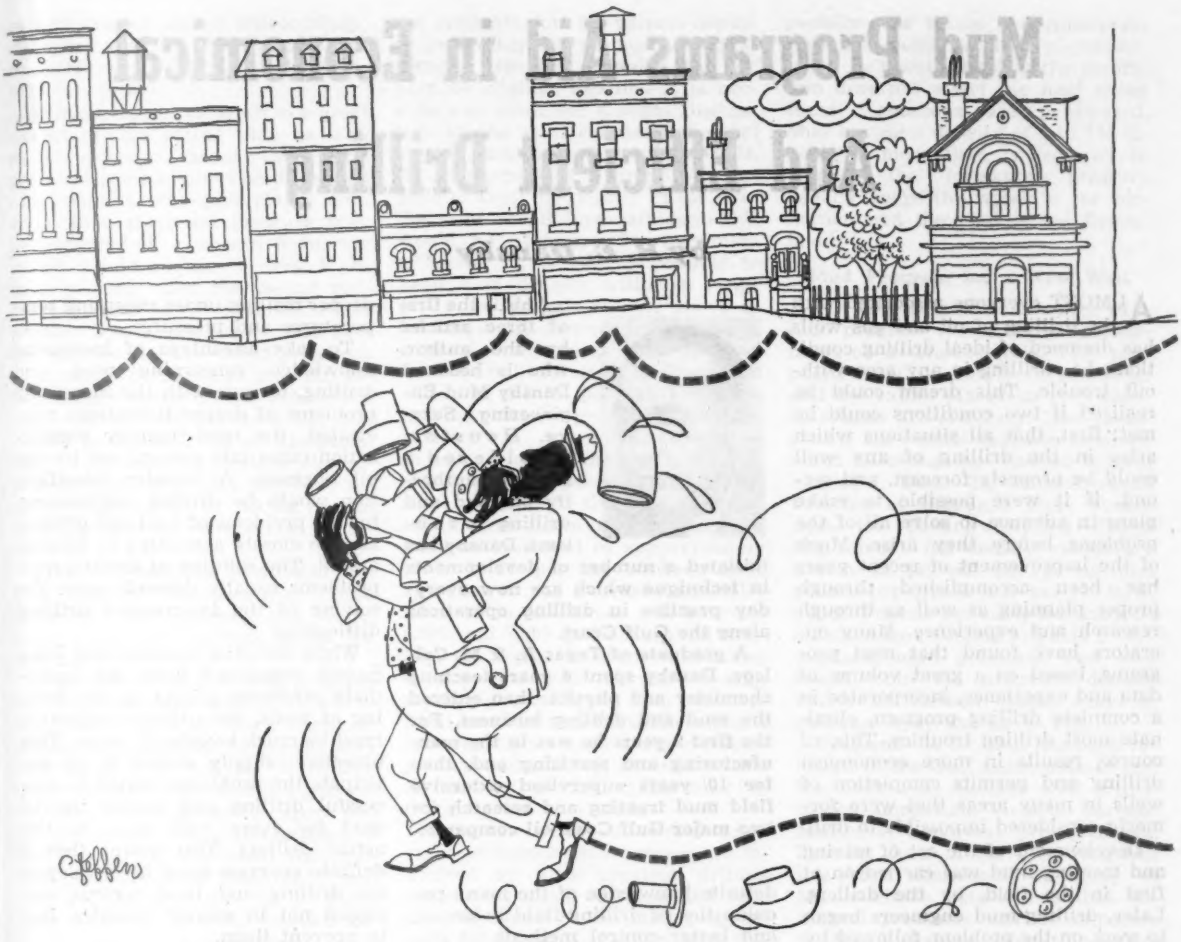
Due to weight restrictions, it cannot be remailed to an APO or Fleet address unless requested by a service man.



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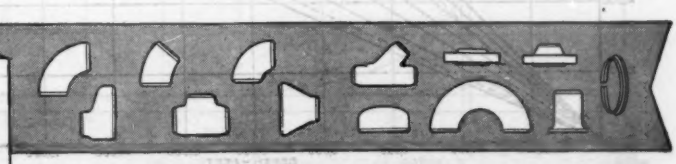

THE COMPLETE LINE OF WELDING FITTINGS AND FLANGES

Mud Programs Aid in Economical And Efficient Drilling

by R. E. Dansby

ALMOST everyone associated with the drilling of oil and gas wells has dreamed of ideal drilling conditions, i.e., drilling in any area without trouble. This dream could be realized if two conditions could be met: first, that all situations which arise in the drilling of any well could be properly forecast, and second, if it were possible to make plans in advance to solve all of the problems before they arise. Much of the improvement of recent years has been accomplished through proper planning as well as through research and experience. Many operators have found that mud programs, based on a great volume of data and experience, incorporated in a complete drilling program, eliminate most drilling troubles. This, of course, results in more economical drilling and permits completion of wells in many areas that were formerly considered impossible to drill.

Development of the art of mixing and treating mud was carried on at first in the field, by the drillers. Later, drilling-mud engineers began to work on the problem, followed by an intensive study by research engineers of the oil industry, universities, technical organizations, and commercial mud and chemical companies, to the end of acquiring more definite knowledge of the many peculiarities of drilling-fluid behavior, and better control methods.

Hence, it is possible at present to predict far more accurately than heretofore the treatments required to avoid many troubles encountered in drilling, and to make possible deeper drilling under mounting temperatures and pressures.

This is the first of three articles by the author, who is head of Dansby Mud Engineering Service, Houston. Considered a ranking authority on mud and drilling problems, Dansby has initiated a number of developments in technique which are now everyday practice in drilling operations along the Gulf Coast.

A graduate of Texas A. & M. College, Dansby spent 4 years teaching chemistry and physics, then entered the mud and drilling business. For the first 2 years he was in the manufacturing and servicing end, then for 10 years supervised extensive field mud treating and research for two major Gulf Coast oil companies.

To take advantage of increasing knowledge concerning mud and drilling, to cope with the increasing problems of deeper formations penetrated, the mud-engineer classification came into general use by the oil business. A broader classification would be drilling engineering, for the problems of mud and drilling are too closely associated to be separated. The solution of drilling-mud problems usually depends upon the solving of the interrelated drilling difficulties.

While the mud engineer has been mostly concerned with the immediate problems arising in the drilling of wells, the ultimate objective must be much broader in scope. This objective, simply stated, is to anticipate the problems related to successful drilling and proper use of mud for every well, prior to the actual drilling. This means that a definite program must be developed for drilling and mud control, designed not to correct troubles, but to prevent them.

Cooperative Program

Development of a program necessitates the utmost cooperation of all departments concerned with wells, from the geological staff to the field men and drilling crews. More specifically, it requires the building up of detailed, factual knowledge of the various geological strata likely to be penetrated. This must be correlated with all known information concerning drilling and drilling fluids, and the prescription to a definite procedure prior to drilling. Proper supervision during drilling, to insure carrying out the planned program, is the ultimate aim.

To make the best possible drilling program a great amount of data is necessary. It is necessary to know the approximate depth of the various formations and what difficulties have been experienced in wells drilled in the area. In some wildcat territory there is often insufficient data to indicate the geological formations or the depth of certain formations where an operator may experience heaving shale, abnormal pressure or lost circulation. However, this is an exception at present rather than a rule owing to extensive exploration in recent years

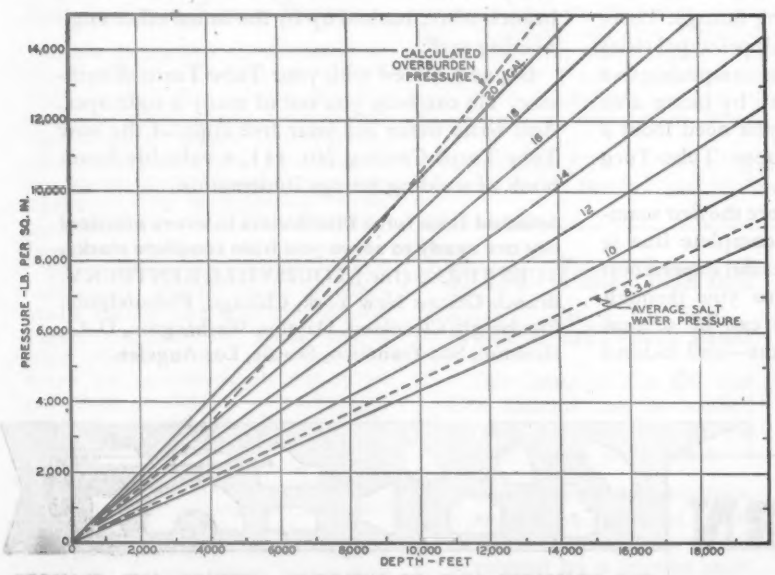

Fig. 1—Hydrostatic pressure versus depth

and to greater use of paleontology, electrical surveys, and other means to determine the depth of the troublesome formations.

A mud program depends to a great extent on the casing plan as well as, to a lesser extent, the coring practice, completion procedure, and other factors. For example, if data show that abnormal pressure may be expected in a certain formation which would require a very high-density mud, then the casing program should be so planned as to prevent loss of the heavy mud into the formations. The other programs are usually prepared to give the information desired on the productive characteristics of the reservoir, but it may be necessary to set up special mud treatments to produce characteristics that will give the best results while coring or taking special surveys during completion procedures.

Mud programs can be divided into two general classifications: first, those for development and workover wells and, second, those for wildcat wells.

It is obvious that a mud program for a development well or for working a well over is much easier to prepare and should be much more successful than one for a wildcat well because data should be available on the pressures to expect and on the productive characteristics of the field. It is important that bottom-hole pressures and other productive characteristics of a workover well be carefully studied before a program is prepared.

It is essential that a mud program, as well as a drilling plan, be prepared by someone familiar with operations and that he give the matter much study and consideration. It is also essential that the plan be approved by proper officials of both operator and the contractor, and that it be written up with copies to each individual who will be concerned with the drilling of the well. All of this eliminates confusion and much guesswork at the well, and also promotes a definite understanding between representative of the contractor and operator. A program unless followed is of no value. Many have doubted that programs could be prepared in advance of the drilling of a well, but experience has proved that if based on sufficient data they can be adhered to in practically all cases. It is also essential that study be given to each proposed well. Blanket programs are successful in some cases. Generally, however, each new well or workover well should be carefully studied and a program tailored for individual conditions.

In preparing a mud program for a development well or for a wildcat well it is advisable to include mud characteristics based on a study of the available data for various depths or preferably for various geological sections expected, in order that the plan be slightly flexible. It is necessary to allow for a slight fluctuation in the mud characteristics set up for various sections of the hole. As an example it is usually impossible to keep the density of the mud the same at all times although this would be necessary for maximum efficiency. It is usually possible to keep mud density within a range of 0.4 lb. per gal., i.e., 0.2 above or 0.2 below the desired density but in a great many cases it is possible with very little effort to keep this within ± 0.1 lb. per gal. range. In making mud programs, abrupt changes in mud characteristics should never be proposed; for example if 12-lb.-per-gal. mud is desired at 7,000 ft. the mud program should call for a gradual increase from natural mud of approximately 10 to 11 lb. per gal. between 6,000 and 6,500 ft. and increased gradually from 11 to 12 lb. per gal. between 6,500 and 7,000 ft. Basing mud density on depth is often misleading because the well may be running much higher or lower than expected from basic information. Therefore it is necessary in many cases to obtain prompt paleontological information as the well is drilling in order to correlate the two wells.

In areas where abnormal pressures or subnormal pressures are indicated by some previous drilling experience much material and time can be saved if the mud program calls for a mud that will control this abnormal characteristic before the formation is encountered. This is especially true where abnormal-pressure salt-water sands are encountered. Salt water held in the formation does not affect the mud when these formations are penetrated. Mud having a density of 1 to 1½ lb. per gal. more than is required to balance the formation pressure usually keeps the water in the formation and the mud is not flocculated.

Mud Program for a New Well

The following is an example of a mud program for either a development or a wildcat well. This proposed well is purely hypothetical and the values placed on mud characteristics are arbitrary. The values shown are results that are obtained when following the "Second Edition of A.P.I. Code 29, Recommended Practice of Standard Field Procedure for Testing Drilling Fluids (tentative)". All density values are shown in pounds per gallon and pounds per square inch per 100 ft. of depth. Pounds per cubic feet may be obtained by referring to Table 1. Hydrostatic mud pressures that will result from the proposed density values at various depths may be obtained by referring to Fig. 1.

Problem.—A location has been released in the Gulf Coast area to test the Cockfield. Another well drilled in the immediate vicinity has encountered abnormal pressures and heaving shale in the Vicksburg and has been abandoned. A study of the available data shows that abnormal pressures can be expected in the Vicksburg over this entire section. There have been no wells nearby to blow out and charge the

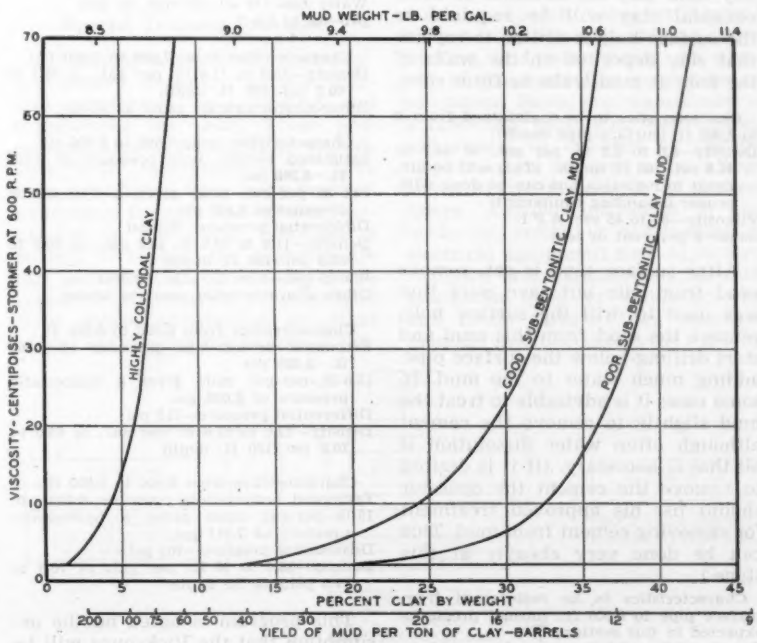

Fig. 2—Viscosity-percentage solids relationship of several clays

upper formations. Vicksburg is expected at 8,000 ft. and several sand sections are expected between the top of the Vicksburg and the Cockfield. Evidence is that each of these sands will have a progressively higher bottom-hole pressure, based on experience in drilling other wells in the Texas-Louisiana Gulf Coast area.

Proposed mud program. — Spudding mud should be prepared by thoroughly hydrating a 5 per cent by weight concentration of bentonitic clay in water. Refer to Fig. 2 to determine amount of clay needed. Select a clay which will supply a reasonably good wall-building mud and a high yield with the lowest density possible, (ordinarily an operator will list clays by trade name available for this). This low density should be maintained until surface pipe is set and cemented. (Note: this well is to be drilled in an area where surface formations have not been charged by previous blowouts). Removal of sand from the mud is necessary to maintain this low-density mud and the addition of more colloidal clay will be required as the surface hole is drilled to replace that clay deposited on the walls of the hole as mud walls or filter cake.

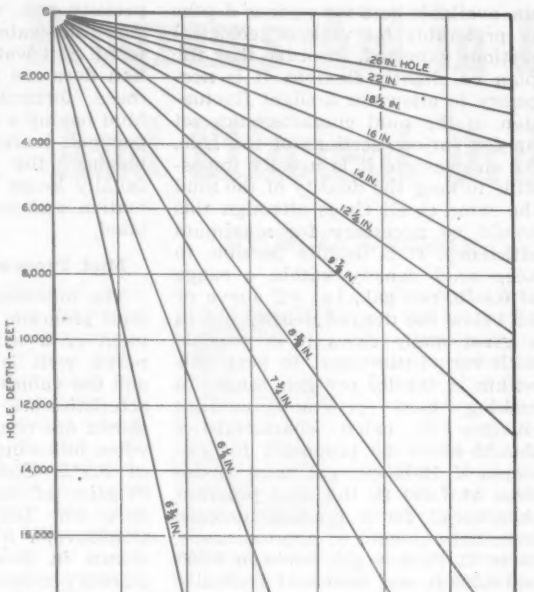

Fig. 3—Content of different size holes in barrels versus depth

Characteristics to be maintained from 0 to 2,000 ft. (surface-pipe depth):
Density—8.6 to 9.2 lb. per gal., or 44.7 to 47.8 psi./100 ft. depth. (This will be difficult to maintain but can be done with proper desanding equipment)
Viscosity—35 to 45 sec. A.P.I.
Sand—5 per cent or less

After surface pipe is set, remove sand from pits but save mud that was used to drill the surface hole, remove the sand from this mud and start drilling below the surface pipe, adding much water to the mud. In some cases it is advisable to treat the mud slightly to remove the cement although often water dissolution is all that is necessary. (If it is desired to remove the cement the operator should list his approved treatment for removing cement from mud. This can be done very cheaply at this stage.)

Characteristics to be maintained from surface pipe to 6,000 ft., normal pressures expected in this section:
Density—9.2 to 9.8 lb. per gal., or 47.7 to 50.9 psi./100 ft. depth
Viscosity—35 to 45 sec. A.P.I.
Sand—2 per cent or less
Water loss—15 cc./30 min. or less
pH—7 to 8.5

Characteristics from 6,000 to 6,500 ft.:
Density—9.6 to 10.2 lb. per gal., or 49.9 to 53.0 psi./100 ft. depth
Other characteristics same as above.

Characteristics from 6,500 to 7,000 ft.:
Density—10.2 to 10.8 lb. per gal., or 53.0 to 56.1 psi./100 ft. depth
Viscosity—40 to 45 sec. A.P.I.
Sand—1 per cent or less
Water loss—10 cc./30 min. or less
pH—6.8 to 7.4

Characteristics from 7,000 to 7,500 ft.:
Density—10.8 to 11.6 lb. per gal., or 56.1 to 60.3 psi./100 ft. depth
Other characteristics same as above.

Characteristics from 7,500 to 8,000 ft.:
Estimated bottom hole pressure at 8,000 ft.—4,568 psi.
12.6-lb.-per-gal. mud gives a hydrostatic pressure of 5,240 psi.
Differential pressure—672 psi.
Density—11.6 to 12.6 lb. per gal., or 60.3 to 65.5 psi./100 ft. depth
Water loss—6 cc./30 min. or less
Other characteristics same as above.

Characteristics from 8,000 to 8,500 ft.:
Estimated bottom-hole pressure at 8,500 ft.—5,285 psi.
13.6-lb.-per-gal. mud gives a hydrostatic pressure of 6,000 psi.
Differential pressure—715 psi.
Density—12.6 to 13.6 lb. per gal., or 65.5 to 70.6 psi./100 ft. depth

Characteristics from 8,500 to 9,000 ft.:
Estimated bottom-hole pressure—6,250 psi.
15-lb.-per-gal. mud gives a hydrostatic pressure of 7,011 psi.
Differential pressure—761 psi.
Density—13.6 to 15 lb. per gal., or 70.6 to 77.9 psi./100 ft. depth

This program is based on the assumption that the Vicksburg will be encountered at 8,000 ft.; in case the well is found to be running higher or lower the depths shown on the plan should be changed accordingly. It is good practice to keep up-to-date paleontological information while drilling in this type of well because many times formations are pinched out and the abnormal pressure section appears unexpectedly.

The operator should list the entire chemical treatment which he has adopted as standard practice. The kind, amount, and cost of all mud and chemicals should be estimated and listed in the program in order that these data will be available when needed. This can be done reasonably accurately when a definite program is made and followed.

Mud Program for Workover Well

It should be possible to prepare an almost ideal mud program for proposed workover well. Office files should contain well characteristics such as bottom-hole pressures, fluid and casing in the hole, and so on. The program should be combined with the entire workover program. It is necessary that a careful study be made of the pressures of any new formations that may be exposed during the workover operation. The first step in preparing the mud program should be to determine the probable formation pressures, the hydrostatic pressures of the proposed

(Continued on page 106)

TABLE 1 — DRILLING MUD — CONVERSION TABLE
(Weight-Fluid Pressure)

Weight per gal. (lb.)	Wt. per cu. ft. (lb.)	Kg./liter sp. gr.	Pressure per 100 ft. ht. (psi.)
8.34	62.4	1.00	43.3
8.4	62.8	1.01	43.6
8.6	64.3	1.03	44.7
8.8	65.8	1.05	45.7
9.0	67.3	1.08	46.8
9.2	68.8	1.10	47.8
9.4	70.3	1.13	48.8
9.6	71.8	1.15	49.9
9.8	73.3	1.17	50.9
10.0	74.8	1.20	51.9
10.2	76.3	1.22	53.0
10.4	77.8	1.25	54.0
10.6	79.3	1.27	55.1
10.8	80.8	1.29	56.1
11.0	82.3	1.32	57.1
11.2	83.8	1.34	58.2
11.4	85.3	1.37	59.2
11.6	86.8	1.39	60.3
11.8	88.3	1.41	61.3
12.0	89.8	1.44	62.3
12.2	91.3	1.46	63.4
12.4	92.8	1.49	64.4
12.6	94.3	1.51	65.5
12.8	95.8	1.53	66.5
13.0	97.2	1.56	67.5
13.2	98.7	1.58	68.6
13.4	100.2	1.61	69.6
13.6	101.7	1.63	70.6
13.8	103.2	1.65	71.7
14.0	104.7	1.68	72.7
14.5	108.5	1.74	75.3
15.0	112.2	1.80	77.9
15.5	115.9	1.86	80.5
16.0	119.7	1.92	83.1
16.5	123.4	1.98	85.7
17.0	127.2	2.04	88.3
17.5	130.9	2.10	90.9
18.0	134.6	2.16	93.5
18.5	138.4	2.22	96.1
19.0	142.1	2.28	98.7
19.5	145.9	2.34	101.3
20.0	149.6	2.40	103.9

Methods Employed to Prevent and Control Fires at Shell's Wood River Refinery

by James F. Goldsberry

FIRE prevention and proper facilities for controlling and extinguishment have always received utmost attention in refineries. Under present circumstances where units are operated at maximum capacity, along with scarcity of materials and long delivery dates, it is doubly important that all precautions be taken to prevent a conflagration that might seriously curtail outputs and result in loss of life. Shell Oil Co., Inc., at its Wood River refinery has gone to great lengths in preventing fires and careful training of personnel for controlling and fighting fires. Successes of this effort are reflected in the small number and size of fires experienced at this plant over the past few years.

Since the need of fire-fighting facilities is dependent largely on the knowledge of fire-prevention regulations, considerable stress is laid on every employe being acquainted with such regulations. This education and the carrying out of the regulations are the responsibility of a fire and safety department, composed of eight men. This department constantly trains 12 crews for each shift to be used throughout the plant regardless of the location of the fire. Approximately 2,000 members of the refinery's normal operating personnel now on active duty, have been trained in the use of all fire-fighting equipment and in fire-prevention methods. Every operator and many maintenance men have been trained as they advance through the various positions in the company's operating organization. In addition to the training given to the members of the 12 crews for each shift, all operators are trained to use a special type of quick-acting hose reel, turret nozzles, and sprinkler systems, all of which are provided at various points throughout the refinery.

A written-permit system is rigidly enforced before craftsmen can work on lines, vessels, or any other operating facilities. Before issuing permits, the fire and safety department with the aid of the operating supervision see that the equipment is completely isolated by blinds, open sewers plugged, no explosive mixtures present, spilled oil removed, proper grounding in case of possible static from hose discharges, oil or gas lines purged with water or inert

James F. Goldsberry, chief engineer of Shell Oil Co., Inc., Wood River refinery, is in charge of design, construction and maintenance engineering. Prior to this time he served in a similar capacity at Shell's former Arkansas City refinery, Kans. In addition, he is fire chief and director of safety. He graduated from Purdue University in 1921 and has been with Shell since 1926.

gas, and numerous other details that have a specific bearing on removing fire hazards in individual units are performed. It is the aim of the fire and safety department that every man in the plant be well acquainted with all restrictions, limitations, and necessary approvals to remove completely all fire hazards. Throughout the month all employes are made acquainted with any experiences whereby explosions or fire might have taken place.

Special Training Provided

All employes, especially operators, are trained to follow closely definite procedures in operating and maintaining the units. These procedures, although varying in accordance with individual units, have been established over many years of experience for safe and efficient operation of the plant. Smoking is strictly forbidden and matches are not permitted; oil or gas leaks are repaired immediately or controlled with steam smothering or other means of reducing the hazard. A definite procedure governs lighting of oil and gas burners in the furnaces or under the boilers. Locomotives, trucks, trailers and cranes, and all other gasoline-driven equipment are not allowed in operating areas without special permit. Such equipment is also forbidden near light-oil loading racks. Tank gaging is performed under a procedure developed to avoid fire hazards and a strict policy governs the removal or cleaning up of all oil spills. All employes in the refinery are constantly drilled in the potential hazards of escaping gas.

All refinery units are inspected during shutdowns for weakness or loss of metal by corrosion. This work is carried on by a competent and well-trained inspection department and consists of a crew of 20 men. The inspection covers every piece of pipe and all oil-containing vessels or tanks, all furnace tubes, and special fittings. By carrying out an inspection procedure in which the measuring of equipment thicknesses is periodically made, and recorded for reference, the life of equipment is determined and hence its failure avoided. Other inspection work covered by craftsmen includes the checking of safety-valve settings and the condition of pump packing, valve packing, and instruments. As a result of this inspection procedure all equipment items are maintained in a first-class condition. Maintenance and repair, as initiated by regular inspections, is believed to be a large factor in fire prevention at this refinery. Regular inspection is also made for arcing or overloading of electrical equipment such as motors, switches, and transformers. All tank auxiliaries such as vents, screens, and flame arrestors are inspected monthly in order to prevent ruptures

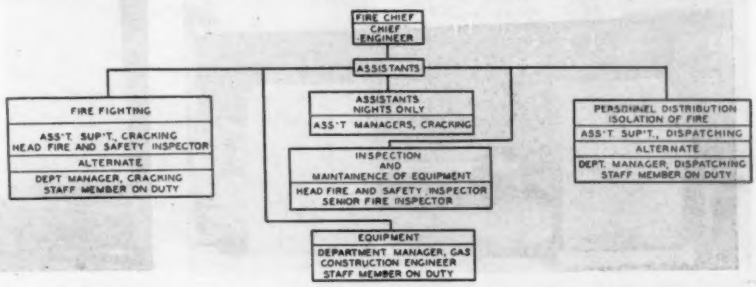

Fig. 1—Chart of basic organization for fire prevention and control

ZONE	CREW												
	1	2	3	4	5	6	7	8	9	10	11	12	FOAM TOWER
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Fig. 2—Zone-assignment chart showing where respective crews are scheduled to report for fire-protection duty

and possible fires. Periodically, the thickness of tank roof and side walls is checked. Any breakage or leaks in the roof are repaired as soon as possible as such vapor leaks can easily result in tank fires, especially in the presence of electrical storms.

In the construction of new units and modernizing or extending the old, considerable attention is given to structural details in order to eliminate or minimize fire hazards. Structural supports of vessels or lines containing oil are fireproofed either with concrete or insulation; low curbs are constructed around various equipment for isolation of areas in case of equipment failure or line breakage. Steam smothering lines are installed in pump houses, pipe stills, pipe trenches, small tanks and agitators, etc. Valves controlling these lines, as well as fuel supply and water quenching, are remotely controlled. Safety or relief valves are installed on all process equipment where pressure may be built up if flow is interrupted. To a great extent dropout facilities are employed in units where it is desirable to remove large quantities of oil and to drop pressures as rapidly as possible. All permanent buildings are constructed of fire-resistant materials. The design and type of electrical equipment in such buildings where inflammable gases may be present are given special attention. Drains from pumps, pipes, traps, etc., are carried quickly as possible to the outside. All pump and compressor houses are well ventilated to avoid concentration of explosive mixtures.

The selection of tank designs and their auxiliaries is influenced considerably from the standpoint of fire prevention. Vapor-tight roofs are used and, where practical, floating roofs are employed. Vacuum and pressure breather valves are used as a protection against fire. Gaging devices are selected with regard to vapor tightness. Where practical, vapor-recovery systems, which add to fire prevention, are installed. The shells of large and especially all-welded tanks are placed on concrete rings to prevent leaks or ruptures in the side walls caused by undue stresses from unequal settling. Retaining firewalls or isolation walls are constructed for all inflammable-products tanks, especially those subject to boilover. In the design and installation of all oil and gas piping, particular attention is given to expansion, contraction, and vibration. Standard construction calls for all piping, fittings, and valves, especially in operating units, to be of steel with gasket materials specifically selected for the hydrocarbon service. All piping discharging into trucks or loading racks is carefully grounded. Submerging the ends of filling pipes is also employed as a safety measure.

Fire-Fighting Facilities

Fire-fighting equipment and training of crews are planned independently of aid from local municipal fire departments; also, it is necessary that the refinery be self-reliant in water requirements as the local town water plants could supply only a fraction of the quantity needed.

Essentially, the facilities for combating fires at this refinery are an independent high-pressure water system well looped with an ample supply of hydrants, portable hose reels, quick-acting hose reels, turret

Fig. 5—Turret nozzle mounted on raised platform

Fig. 3—Foam and water quick-acting reels

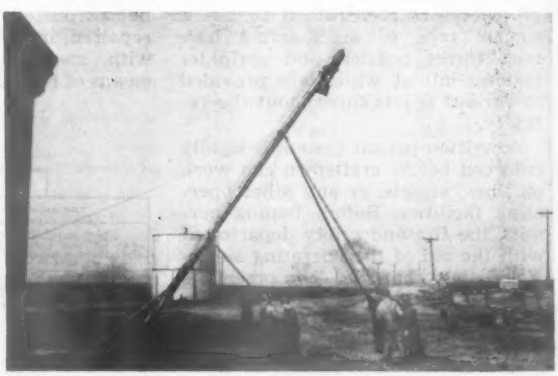

Fig. 4—Raising telescope foam tower

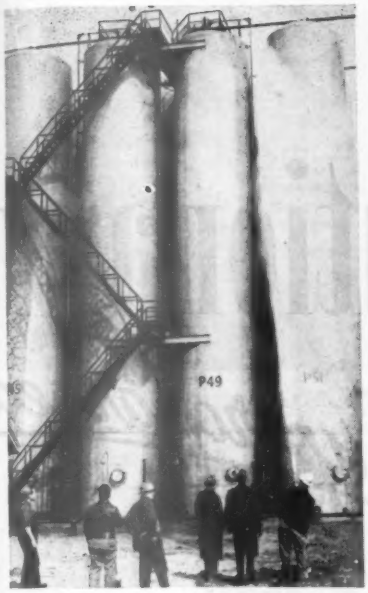

Fig. 6—Turret nozzle in action

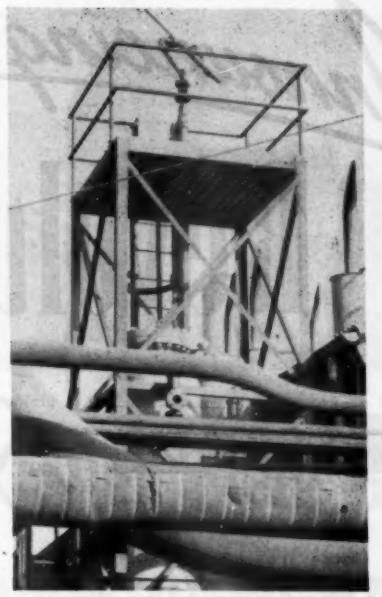

Fig. 7—Turret nozzle mounted on raised platform to eliminate interference

nozzles, both wet and dry foam installations, 40-gal. foam extinguishers, carbon tetrachloride and carbon dioxide extinguishers, steam smothering systems, sprinkler systems, isolation curbs, tank firewalls and dykes, trucks and trailers with numerous items of smaller equipment.

The refinery's high-pressure water system consists of three centrifugal pumps, two driven by gasoline engines and the other by a steam turbine capable of delivering 1,500 g.p.m. each at 175 psi. into a grid-iron distribution system. Water can be delivered into any section of the plant from at least two directions. All sections can be blocked off for repairs without materially affecting delivery of water into the area which it supplies. By actual test two pumps will deliver 3,000 g.p.m. through 13 fire streams at an average nozzle pressure of 100 psi. at any point in the refinery. The pumps draw on a storage of 40,000 bbl. of water contained in 15,000 and 25,000-bbl. tanks. The storage is supplied mainly from electric-driven wells in the cooling water system of which four are dual-driven with gasoline motors and can deliver 2,000 g.p.m. in case of a power failure. Three more similarly driven units will be added in the future; also facilities at the barge-loading docks provide an additional 1,100 g.p.m. from the Mississippi River. The docks are protected by an individual 475-g.p.m. gasoline-driven pump that delivers water through turret nozzles which are located at various points on the dock.

A total of 16,800 ft. of 2½-in. water hose is distributed throughout the refinery in firehouses, trucks, portable reels, and quick-acting reels. In addition to the portable reels and quick-acting reels, 2,700 ft. of hose is transported by special truck to any fire within a few minutes after the alarm is sounded. There are 125 water hydrants equipped with nozzle valves and wrenches located so that sufficient hose connections are within easy reach of all units but not too close as to become inoperative on account of fire or heat.

The central foamite or wet system is connected to the refinery operating units, all rundown tanks and some of the storage tanks. A total of 75,000 gal. of each solution is normally maintained. A sufficient amount of chemicals is kept on hand completely to recharge the system. Thus the central system will deliver 1,200,000 gal. of foam. By routine inspection the pumping facilities and piping installations are always maintained in first-class shape. A total of 14,950 ft. of 1½-in. foam hose is distributed throughout the refinery on trucks, portable reels and quick-acting reels. In addition, 1,250 ft. of hose is maintained in the central warehouse. All portable and quick-acting reels are equipped with mixing tube, siamese connections, and nozzle. Six mixing tubes, 10 siamese connections and 10 nozzles are kept in reserve.

Foam Powder System

The foam powder system comprises 12 portable foam generators and approximately 90,000 lb. each of A and B powder. The powder is stored in various locations in the refinery and when mixed with water will produce 1,350,000 gal. of foam. In addition to powder stored at the refinery, the refinery also, by special arrangement, has access to 100,000 lb. each of A and B powder stored in the immediate vicinity. The tanks in the three adjacent tank farms are equipped with foam-mixing chambers with the lateral lines from the mixers extended through firewalls at locations adjacent to water hydrants for easy connection to the portable generators.

The refinery is also equipped with three telescopic-type foam towers fully equipped with Moeller tube and all necessary rigging so they can be erected for feeding into top of tanks with minimum delay. A truck is assigned to this equipment, and it is automatically transported to all fires in the tank-farm zones. The towers are adapted for use with both wet and dry powder foam systems.

Located in the refinery garage, a 1½-ton fire truck responds to all fire alarms. Important among the fire-fighting apparatus carried in the fire truck's special body are water hose, foam generators, oxygen-breathing appartus, water and fog nozzles, extension ladders and hand

(Continued on page 107)

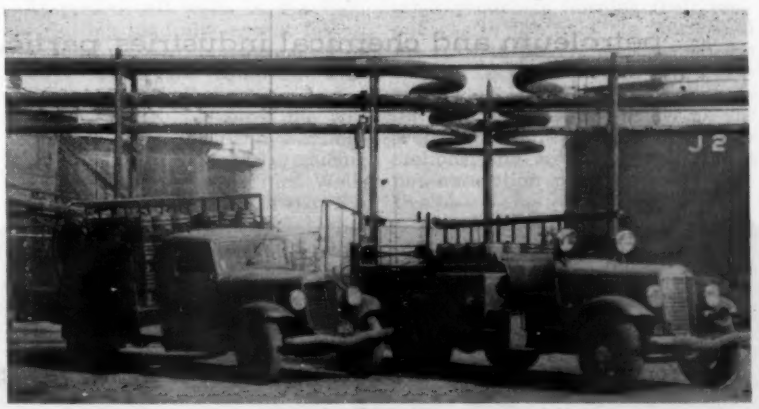

Fig. 8—Fire truck and auxiliary hose truck

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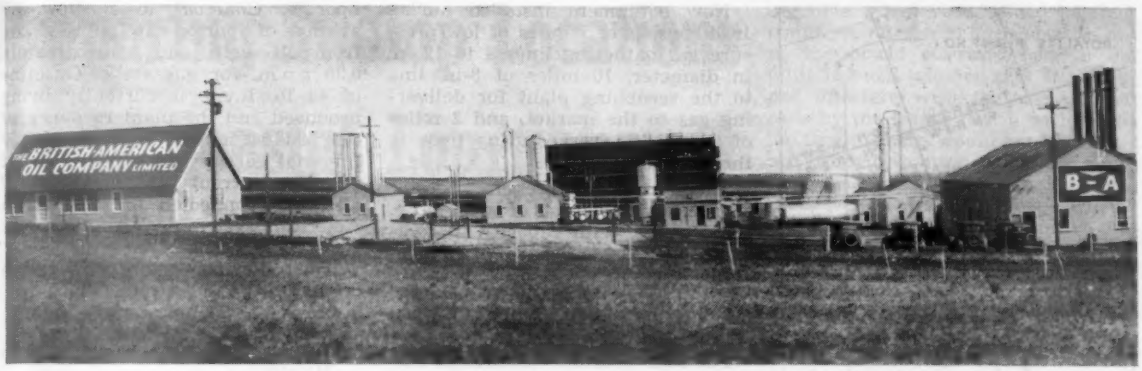


View of absorption plant of British American Oil Co., Ltd., in Turner Valley field

Turner Valley Field Gets First Gas-Repressuring Program

by J. A. McCutchin*

OPERATIONS of the newly constructed British American Oil Co., Ltd., repressuring and gas-conservation program started in December 1944. This program makes possible the complete utilization or storage underground of all gas produced from 69 oil wells and 12 gas wells in the south, 5,600 acres of the Turner Valley field.

The first gas production from Turner Valley was discovered in 1913, from a shallow sand, while the first gas and distillate production from the main producing Madison limestone zone was discovered in 1924[1]. The first major crude-oil well was drilled in 1936 and since that time the field has been almost completely developed, both in the oil and gas zones. The above-cited article gives an excellent history of development between 1913 and 1939 and should be consulted by anyone interested in basic geologic and other information concerning early Turner Valley development.

It is of interest to note that the field is a closely folded, steep-dipping, highly faulted overthrust anticline. The oil is of high gravity, varying from 50° A.P.I. as produced from wells high on structure, to 38° A.P.I. from wells low on structure. There appears to be no effective water drive although several wells low on structure are producing small amounts of water. The present water level is variable for different parts of the field and is influenced by fault blocks.

The fluid-level data indicated on the cross section (see Fig. 2) were obtained when bottom-hole-pressure tests were made and after wells had been shut in 24 hours. Gas-oil ratios are highly variable but in most parts of the field are related to structural position and age of the wells. Gas-oil ratios of oil wells in the field averaged 6,360 cu. ft. per barrel for the month of December 1944 and was 5,610 cu. ft. per barrel in December 1943. Indications are that gas-oil ratios will continue to rise.

*Manager, production division, British American Oil Co., Ltd., Calgary, Alta.

Field Operations

The Turner Valley field is located in the foothills area and is approximately 20 miles east of the 10,000-ft. Highwood range. The general elevation is 4,000 ft. and the weather is extremely variable throughout the year.

At present all wells in the field are flowing naturally except for an occasional gas-lift operation. Oil-storage tanks are equipped with steam coils and oil must be heated to 60° F. before the pipe line will accept delivery. Paraffin accumulates in the tubing of producing wells, in tanks, and pipe lines. Wells are serviced for removal of paraffin once or twice per month and heat is used to prohibit paraffin deposits in tanks and pipe lines. Oil pipe lines and gas lines are buried 40 to 60 in. under the surface which is the approximate frost line. All production equipment is imported from the United States and field practices tend to follow California methods more than Mid-Continent techniques.

Turner Valley production is currently approximately 21,000 bbl. per day, which is insufficient to meet local needs in Western Canada. Proration is administered by the Alberta Conservation Board under a unique plan which is on a "reservoir fluid" basis. Reservoir fluid is obtained by computing the reservoir space that the free gas and solution gas occupy, and the reservoir space occupied by the oil, then allowing the wells to produce equal volumes on this basis. Excellent records of production and bottom-hole pressures are maintained. The current per-well quota is 25 bbl. of reservoir fluid per acre per day.

Up until April 1944 one company had an exclusive gas-sales contract with the gas company supplying domestic and industrial markets in Southern Alberta, which resulted in other producers burning their residue gas in the field. In April 1944 the Alberta Government passed the Natural Gas Utilities Act which provides ratable taking from all producers of gas and also makes all gas wells, gas pipe lines, compressor stations, and scrubbing plants (but not absorption plants) public utilities.

The British American repressuring and gas-conservation program was constructed by order of the Natural Gas Utilities Board and the operation is essentially a service operation, providing for gathering low and high-pressure gas, delivering this gas to an absorption plant, recompressing the residue gas to sufficient pressure for delivery to the market or return to the reservoir.

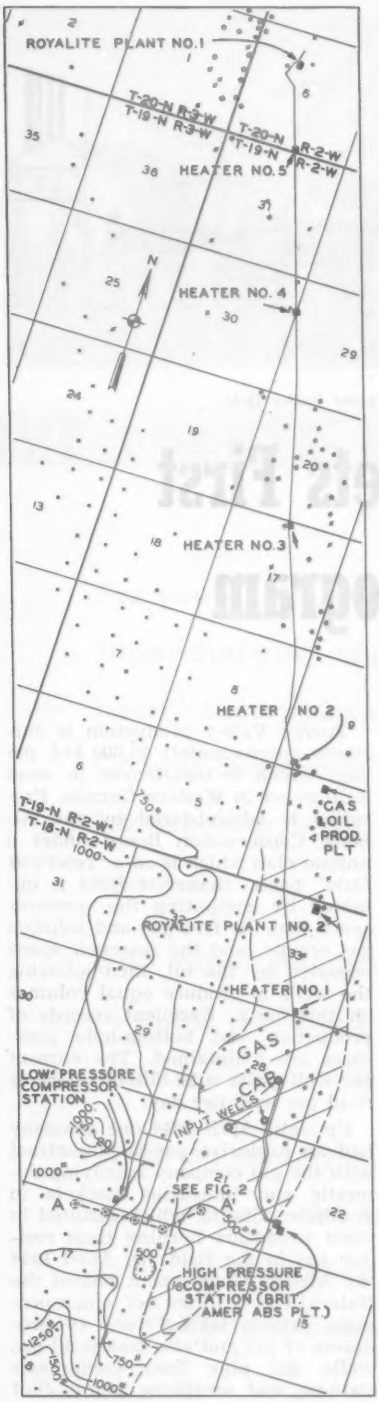


Fig. 1—(Above) Repressuring starts with British American Oil Co., Ltd., installing 19 miles of gas-gathering and pressure-input lines, tied in with low and high-pressure compression facilities. Injection pressure is about 800 psi. Fig. 2—(Right) West-to-east cross section through south part of field (profile location A-A' shown in Fig. 1). Free gas cap is present high on structure. Note lowering of gas-oil contact with increasing age and with withdrawals

New equipment installed during 1944 consists of 7 miles of low-pressure gas gathering lines 4 to 12 in. in diameter, 10 miles of 8-in. line to the scrubbing plant for delivering gas to the market, and 2 miles of 8 and 6-in. repressuring lines to three gas-input wells.

There is a low-pressure booster station, which consists of two 600-hp. compressors, with capacity to compress 6,500,000 cu. ft. of gas from 10-lb. pressure to 170-lb. pressure and deliver it to the existing high-pressure gas-gathering system which operates at 150 lb.

The high-pressure compressor station consists of two 600-hp. compressors and one 400-hp. compressor, capable of recompressing 20,000,000 cu. ft. of gas from 150 to 400 lb., or 13,000,000 cu. ft. from 150 to 800 lb. for repressuring. The high-pressure station is capable of either repressure service or fuel-gas service by use of valve lifters on compressor cylinders, which change the compressor cylinders from double acting to single acting.

The gas contains approximately 350 grains of H_2S per 100 cu. ft. and is scrubbed to 10 grains by caustic washing before using as compressor fuel.

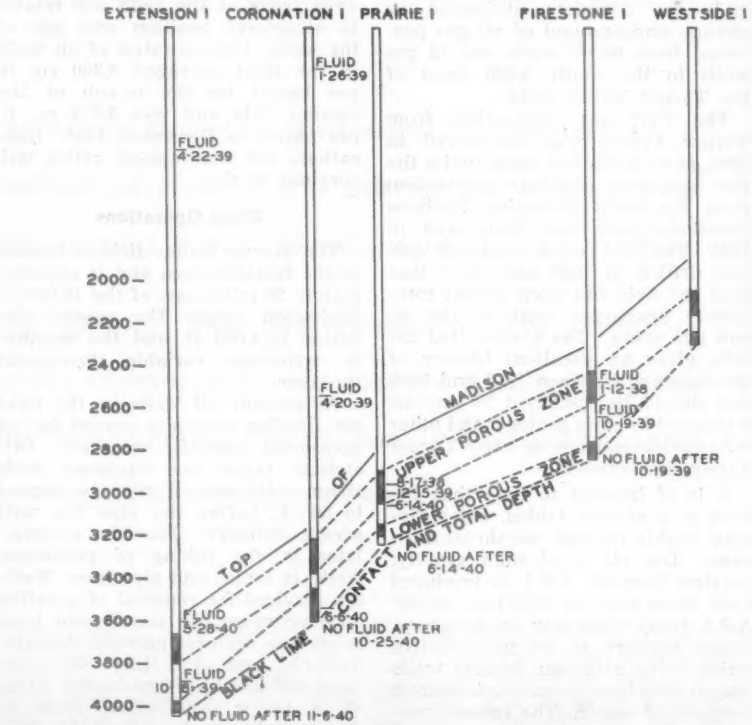
The gas is very lean compared to most fields where gasoline plants operate. Charcoal tests show an average of approximately 0.15 g.p.m. from oil wells and approximately 0.30 g.p.m. for gas wells. Gasoline of 45 lb. R.v.p. is currently being produced and the plant recovery of this product is between 0.50 and 0.55 Imperial gallons per 1,000 cu. ft. of gas. The current gas allowables of all wells connected to the British American system is 20 million per day.

The following is the composition of the gas from an oil well operating at a separator pressure of 115 lb. and a temperature of 40° F.

	Mol. per cent
Methane	84.83
Ethane	8.57
Propane	4.40
Butane	1.63
Plutanes plus	.58
Specific gravity	.675

There was 290,000,000,000 cu. ft. of gas produced from the British American area before the conservation program was started of 50 to 60 billion cubic feet of gas as of January 1, 1945. In the future, approximately 50 per cent of the residue gas from the absorption plant, or about 8 million cubic feet per day, will be sold as fuel and 50 per cent returned to the gas cap for storage and future use.

1. Vernon Taylor: "Development of the Turner Valley Gas and Oil Field," A.I.M.E. Petroleum Technology, August 1939.



DATE COMP.	1-'39	6-'38	10-'37	11-'37	3-'37
INIT. OIL	586	500	836	400	297
INIT. G.O.R.	1050	1130	2800	2590	16890
NOV.'42 G.O.R.	3130	6430	17600	34500	41800
NOV.'42 OIL PRO.	145	58	22	13	
SEPT. 42 B.H.P.	1190#	906#	925#	660#	592#

Preparing Swamp Locations In Coastal Louisiana

by Neil Williams

PROVIDING access to drilling sites and solid support for rig assemblies in isolated swamp locations often calls for the exercise of an operator's ingenuity. Various expediencies may have to be accepted to meet different conditions. Few areas present identical problems, and advantage must be taken of individual circumstances and means at hands to surmount them.

Typical of the ingenuity often called for in such instances was that shown by a major company in undertaking a deep wildcat test in one of coastal Louisiana's remote cypress and gum swamp areas. Densely wooded, and having from 3½ to 4 ft. of water and decayed vegetable refuse overlying a more or less unstable clay bottom with a thick tangle of submerged timber, this swamp presented a number of unusual difficulties and complications in the way of access to and preparation of drilling sites.

Location of the drilling site was about 2½ miles from a navigable stream and about 1¼ miles from the nearest usable road. Dredging of a canal from the navigable stream so that a drilling barge could be brought in and used for the test was considered but in view of the distance and the dense wood growth, which would have to be cleared, and the tangle of submerged timber, this would have involved excessive costs and problems. Also, the building of a 1¼-mile road through swamp, necessitating throwing up a high fill the entire distance, would have been difficult and costly.

It so happened, however, that the location for the well was only 600 ft. from a tram road which had been built by a lumber company several years before to haul logs from the swamp to a sawmill. Consequently it was decided to employ a land rig to drill the test, and make arrangements with the lumber company to share the use of this road for bringing in materials and personnel to the location.

Use of the tram for automobile and truck traffic required the laying of a board road. Since logging trains would continue to operate on it, the board roadway had to be built in such manner that it would not interfere with the use of the rails by the trains and in such fashion that the rails would not be a hazard to rubber-tired vehicles. How this was done is shown in Fig. 1, a cross-section drawing. This particular drawing is a cross-section of the roadway as supported on a trestle. At other places the ties supporting roadway rest directly on roadbed.

The section of the tram road used was approximately 5,230 ft. long. It required the building of about 285 ft. of approach from the nearest road and about 600 ft. of standard board road at the other end to the well location. Fills for the latter road, as well as for the drilling site, were made with sawdust. The tram road, used for several years by logging trains, had been laid on a sawdust fill, and since this had stood up fairly well, use of this material for the board road extension, turnarounds, and rig was considered satisfactory.

Large quantities of sawdust were available for the hauling from sawmills served by the tram road, and by its use a substantial saving was made as compared with the cost of a dirt and shell or gravel fill which otherwise would have been required. Because of submerged timber under the swamp it was considered impractical to construct a piling foundation for the rig.

The drilling-site area of the swamp was filled in to a depth of 4½ ft., for which approximately 4,000 cu. yd. of sawdust were hauled. A fill of 2½ ft. was made for the turnarounds and the board road from the tram. The derrick was supported by a 48 by 48-ft. timber mat laid directly on top the sawdust. No excessive vibration or settling was observed during the drilling of the well. A steam rig was used and boilers were set on a separate mat.

Below: View of combination tram and board road leading to swamp-located drilling operation. Left: Standard board road and drilling rig supported on sawdust fill in coastal Louisiana swamp

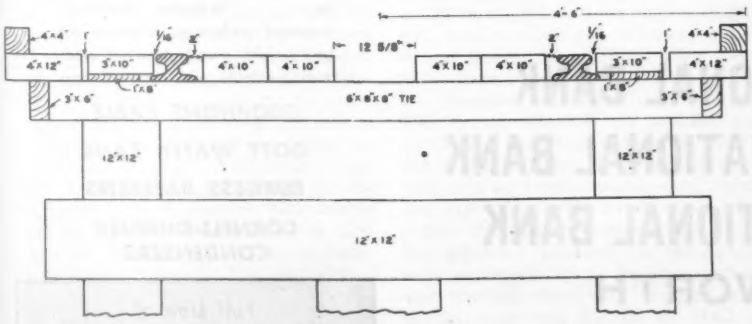
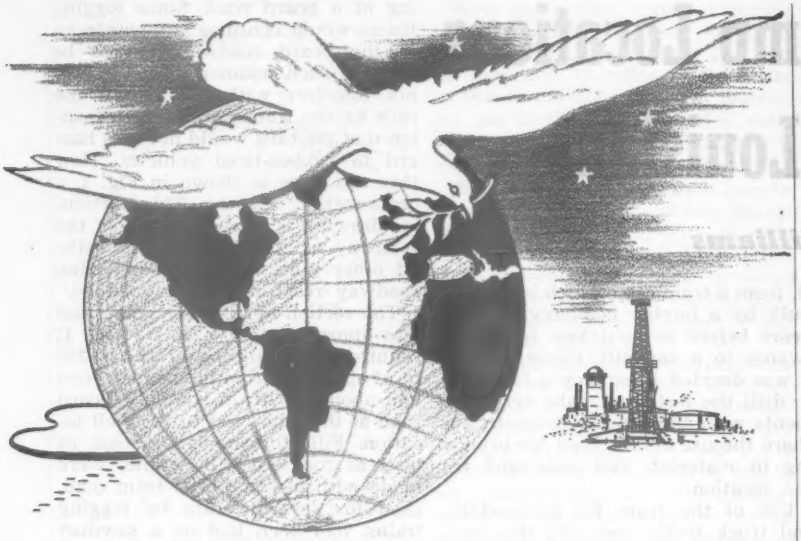


Fig. 1—Cross section of board road laid on tram road serving both trains and rubber-tired vehicles. This section shows trestle, but at other places the ties are laid directly on sawdust fill



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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Heat Absorbed by a Tank During a Fire

How much heat would be absorbed by a tank or vessel that is exposed to a fire?—A.C.W.

Obviously the rate of heat absorption is dependent upon many factors each of which would tend to alter the absorption rate. Thus, if the fire were out in the open so that it could radiate in all directions, the rate of heat absorption by the tank would be somewhat low even if the fire were all around the tank. If the tank is housed inside a building, particularly if the building has stone walls, heat would be radiated from the walls of the building giving a high rate of heat absorption. If the fire is confined between the walls of several tanks, particularly if they are close together, the rate of absorption may be very intense. Obviously the wind can blow the flame into an intense blast against the side of the vessel, or updrafts or chimney effects would greatly alter the rate of heat absorption. Finally, the material in the tank, particularly whether it be a liquid or a gas, is vital because liquids are able to carry the heat away from the metal surface at a rapid rate whereas gases are poor conductors of heat. Although gases tend to slightly lower the rate of absorption they also make the temperature of the metal wall rise, in some cases to a red heat. Thus, there cannot be a simple answer to the question.

The engineering office of the American Petroleum Institute has prepared a theoretical analysis entitled, "The Rates of Vaporization in Gasoline in Storage Tanks Exposed to Fire," which assumes that the rate of heat absorption is 6,000 B.t.u. per hour, per sq. ft. of surface (with liquid on other side). This discussion underlies the Emergency Relief Specifications applying to process and storage equipment published by the National Fire Protection Association (N.F.P.A. "Flammable Liquids Ordinance," published in the National Fire Codes for Flammable Liquids, Gases, Chemicals, & Explosives, 1943, and in separate pamphlet form). Also the National Board of Fire Underwriters ("Containers for Storing Liquids," N.B.F.U. Pamphlet No. 30, N.B.F.U., New York, 1941, pages 37 and 38).

A number of experimental fires have been staged for the study of heat absorption rates, these indicating rates ranging from 19,700 to 33,000 B.t.u. per hour per sq. ft. Aluminum Co. of America, New Kensington, Pa., in "Impact, Hydrostatic, and Fire Tests — Aluminum Alloy Compartments for Tank Trucks" (1930) reports 20,000 to 29,000 on a 150-gal. gasoline compartment. Bulletin of Research No. 3 of the Underwriters' Laboratories, Inc., Chicago, Jan. 1938, entitled, "Opacity of Water to Radiant Heat Energy," shows 32,000 B.t.u. on a 24-sq. ft. steel plate. A 1,000-lb.-capacity propane tank gave a maximum rate of heat absorption of 23,000 B.t.u., according to J. F. Fetterly, of Bureau of Explosives, 1928, in "The Determination of the Relief Dimensions for Safety Valves on Containers in Which Liquefied Petroleum Gas Is Charged and When the Exterior Surface of Container Is Exposed to a Temperature of 1,200° F."

Duggan, Gilmour & Fisher (Venting of Tanks Exposed to Fire, Quarterly of National Fire Protection Association, Vol. 37, No. 2, Oct. 1943, Part 1, Boston) report four tests which gave an average rate of absorption of 19,700 B.t.u. into a 10,200-gal. and a 7,000-gal. vertical cylindrical tanks. In addition they mention three other tests, one on a 100-lb. propane container showing 21,600 B.t.u., another on a 1,000-gal. container showing a rate of 33,000 B.t.u. for a short time, and a third test on a horizontal water tank about the size of a tank truck placed inside a diked area flooded with burning gasoline showed an absorption rate of 24,960 B.t.u. for the part of the surface that was wetted with liquid (reported by H. H. Hall of Standard Oil Co. of California).

These same authors believe that much lower rates will result for large tanks because of the relatively small surface (per unit of contained volume of liquid) exposed by such tanks, because the likelihood of complete envelopment with flame is less and because a longer time is required for heating. In their analyses of large atmospheric-pressure storage tanks they used the following rates of heat absorption:

	B.t.u./sq.ft./hr.
20,000 gal.—15 ft. dia. ...	20,000
100,000 gal.— 2,400 bbl. ...	6,000
300,000 gal.— 7,150 bbl. ...	5,000
1,000,000 gal.—23,800 bbl. ...	2,300

Value of 1° A.P.I. in a Crude Oil

The gravity of our sour crude oil ranges from 36.2° to 40° A.P.I. The 40°-gravity crude contains more light ends and is more valuable, but how much is it worth to us as refiners? B.G.M.

There is no single answer to your query because of the many varieties of crude oils that are available, and because of the particular facilities that each refiner may be able to use in processing the oil. Nevertheless, there are certain factors that may be considered. First of all, the schedule for crude oil in most districts is a basic price to which 2 cents per barrel is added for each increase of 1° in the A.P.I. gravity. Thus, when handling 1 bbl. per day of crude which a gravity 1° A.P.I. higher than another crude oil, the extra annual cost of crude oil is about $7.30. The higher-gravity crude oil will suffer a greater gas loss in refining, and in the case of Illinois crude oils of 36-40° A.P.I., the loss according to Bureau of Mines analyses, is about 1.25 per cent greater for each increase of 1° in the A.P.I. gravity.

1. If the additional gas loss of 1.25 per cent is completely recovered and burned as fuel (replacing 10-cent-per-million B.t.u. purchased gas) it will be worth about $1.62 per barrel per year. In addition, if the gas fuel replaces oil fuel it has some extra value because its combustion can be accurately controlled and because it saves the atomizing steam needed for most oil burners. What the superiority of gas as a fuel is worth is hard to say, but it can hardly be large enough to raise the value of the plant gas to the extra $7.30 cost of the crude oil.

2. If the entire 1.25 per cent of gas loss could be incorporated into liquefied petroleum gases or into the gasoline as an agent for increasing the vapor pressure it would be worth (at 5 cents per gallon) about $9.60 per barrel per year. This is, of course, larger than the $7.30 extra paid for the crude oil, but it is certainly not possible to recover the entire extra gas loss into liquid products.

Left: Cutting of nipples by oxy-acetylene torches. Right: Long and short types of "hay buggies" developed in cooperation with engineers of Plantation Pipe Line Co. to reduce labor required for replacing cartridges of excelsior filter medium. Hand-operated winches aid in removing cartridges from hay tanks

Pipe-Line Fabricating Shop Features Special Equipment

by Paul Reed

THE fabricating shop of Williams Brothers Corp. at Chamblee, Ga., is a unique facility, representing what has been accomplished by a construction firm which was left with a large warehouse in a locality remote from oil and gas areas after completing work on two large pipeline systems. The warehouse was converted into a shop for precision fabrication of piping both for installation at projects contracted in the southeastern region and in foreign countries. By having adequate facilities for such undertakings, the organization has been in position to serve construction requirements of the Army and Navy and civilian industries. In addition to pipe fabrication, a variety of equipment has been made, including devices to aid in the removal of excelsior cartridges at products pipe-line stations, nipples for a munition program, and power-driven river boats for pipeline-construction operations in this country and abroad.

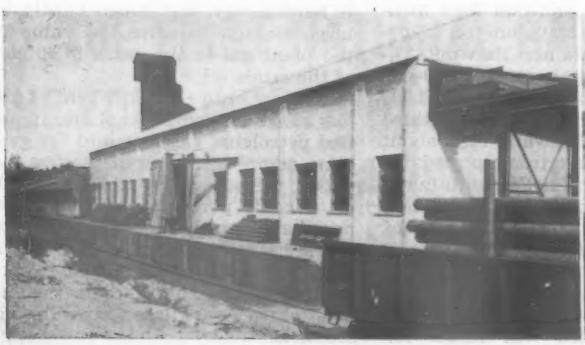
The equipment for precision pipe fabrication is of a highly specialized type not generally found in shops of this type.

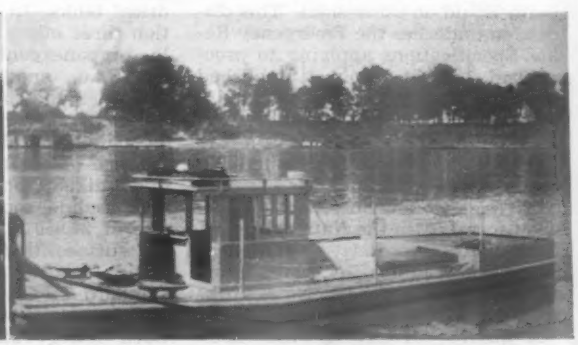
A feature of such equipment at the Chamblee shop is a bending table, specially designed by the Williams Brothers organization to overcome a difficulty resulting from wartime steel shortages which prevented the use of a solid steel block to hold the joints and nipples to be bent after being heated in the furnace.

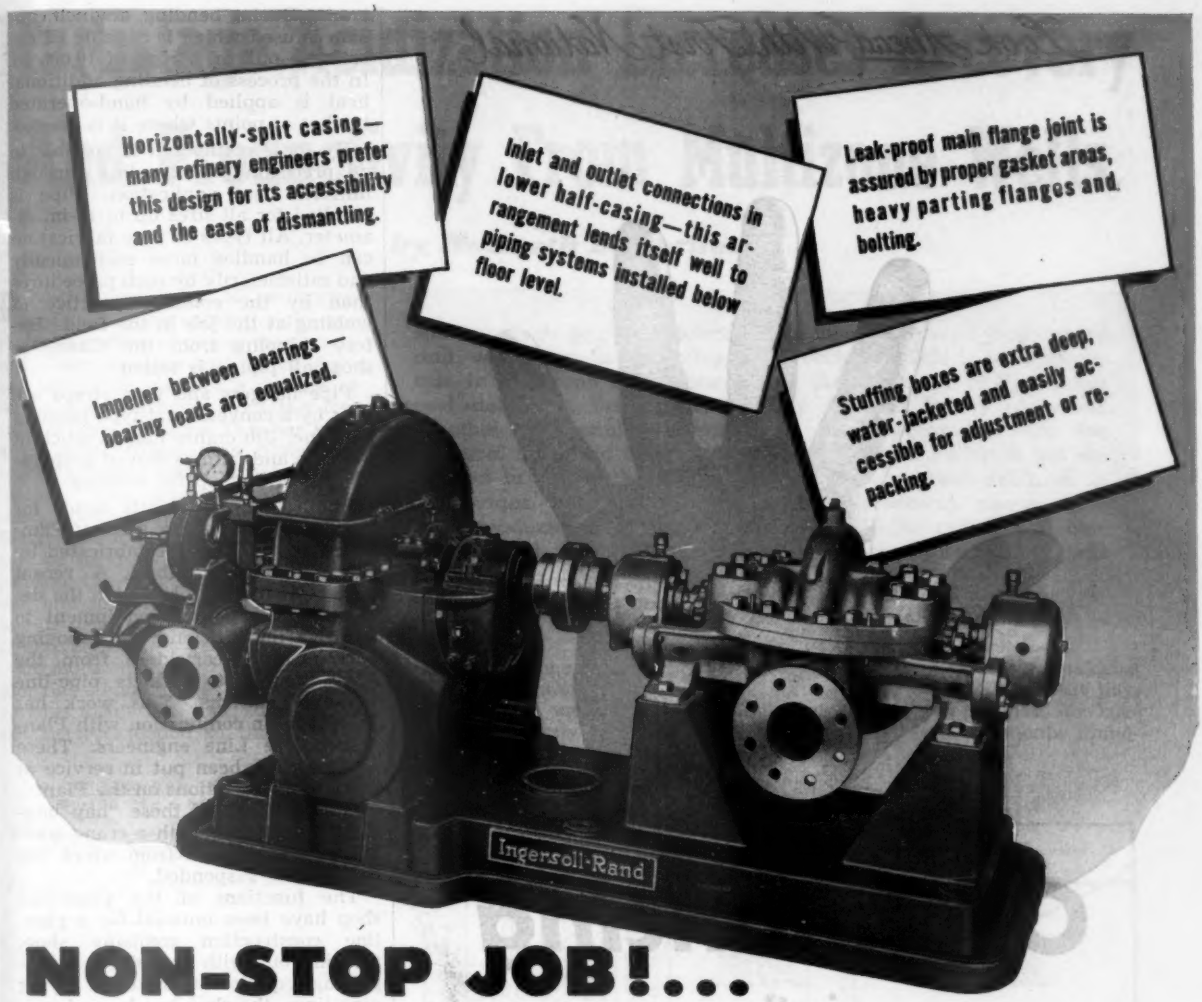
To provide for conducting heat at a sufficient rate to avoid warping of material during bending operations, a water-cooled table was built. Dimensions are 12 by 16 ft. and 2 ft. high, weighing 8,000 lb., fabricated of 8-in. I-beams of ¾-in. plate. In the top and bottom of the table are 3-in. perforations in the webs and flanges of the beams to facilitate the flow of water which is circulated by a pump handling 200 gal. per hour for cooling the table.

The first step in pipe bending at the Chamblee shop is unusual for pipe-line piping jobs. The nipple, joint, or section to be bent is hoisted to a sand tower where it is filled with sand which has been previously dried in the shop's sand-drying equipment. The sand is tamped in the pipe. By using sand in this way crushing of the pipe walls is prevented in later operations after heating in an oil-fired furnace prior to being pinned down to the bending table by equipment inserted in 3-in. holes penetrating the table. The hot pipe is handled by an overhead

Left: Shop of Williams Brothers Corp. at Chamblee, Ga., originally employed for overhauling construction equipment and later engaged in fabrication of piping and other equipment. Right: Type of engine-driven barge built at the Chamblee shop for pipe-line construction operations in foreign countries



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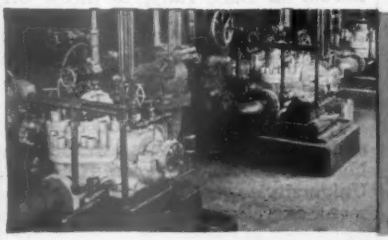
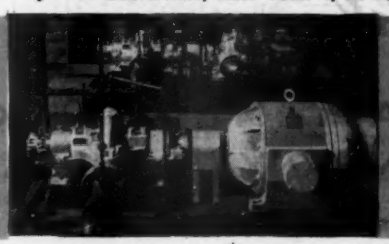
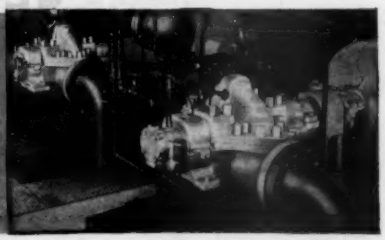

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crane. During bending, a winch capstan is used which is capable of exerting a pull on a rope of 10,000 lb. In the process of bending additional heat is applied by hand-operated torches at points where it is needed.

By these methods it is possible to do precision pipe bending through uniform heat application. Pipe is handled for all sizes up to 16-in. diameter. All types of pipe fabrication can be handled more economically and satisfactorily by such procedures than by the common practice of welding at the job in the field. Before shipping from the Chamblee shop, all piping is tested.

Pipe hangers and pipe straps are bent by a conventional-type bending machine. Jib cranes handle much of the pipe and fittings moved preparatory to setting up for welding.

Pump loops with stiff bends for the Baton Rouge tank farm of Plantation Pipe Line were fabricated by the methods described. A recent project of the shop has been the development of special equipment to improve the efficiency of removing filter-medium cartridges from the "hay tanks" at products pipe-line pumping stations. This work has been done in conjunction with Plantation Pipe Line engineers. These devices have been put in service at more than 20 stations on the Plantation line. Each of these "hay buggies" is equipped with a crane traveling on an I-beam from which the cartridge is suspended.

The functions of the Chamblee shop have been unusual for a pipeline construction company shop. Starting out with the object of repairing equipment used in laying pipe lines, the shop has been developed to a point where it is now principally engaged in specialized operations. In addition to fabricating precision manifold and other piping, the shop functions to improve the efficiency of certain pipeline and other petroleum operations through developing and making types of special equipment for use in this country and South America.

Val Stanley Zdun, Chester, Pa., a young seaman who risked his life to save his ship and crewmates, was honored by Sun Oil Co. at ceremonies on board the tanker "M. S. Sun" May 25. Zdun swam 50 yards during a rain of exploding bombs, ammunition and gasoline cans at the harbor in Bari, Italy, to throw off the mooring lines that held the tanker in danger of major disaster. He is the first recipient of the J. Howard Pew award.

H. R. Cullen, Houston oil operator and philanthropist, was awarded an honorary doctor's degree at Baylor University's centennial commencement exercises this week.

Multistage Acidization Increases Recovery And Productivity From Multizone Wells

by Kenneth B. Barnes

Acidizing can pay off handsomely in increasing well productivity and, very often, in obtaining more recovery. This is particularly true in multizone formations. As to the character of limestones and dolomites, the porous makeup is here briefly reviewed, whether foramenular, intermediate, or intergranular. On the practical side, two jobs on Clear Fork wells at Fullerton are described in detail: the first where three zones were acidized, in five stages, with a total of 24,000 gal.; the second, also a multizone producer, with four stages totaling 16,000 gal., by Electric Pilot control. A pool engineering report on the Fullerton field was published in last week's issue.

PROPER acidizing of multizone wells often can obtain for the operator the effect of two or three good wells per location instead of only one well with perhaps a dribble of oil or poor recovery from the less well-exposed sections. This has been a powerful stimulus in prompting more extensive use of sample examination, core analyses, electrical, mud, radio-activity logging, and Electric Pilot surveying. These tools can be used to good advantage in locating the pays that may be present, and to determine their character in order to acidize them most effectively.

In more than one way the operator has advantages in acidizing calcareous formations that, so far, have not been extended to the field of shooting sandstone formations. Acidizing is an injection process, and the input pressures and rates therefore are instantaneously known while the actual work is being done. This helps evaluate the treatment and the pay, and serves as a criterion for succeeding stages or treatments. Imme-

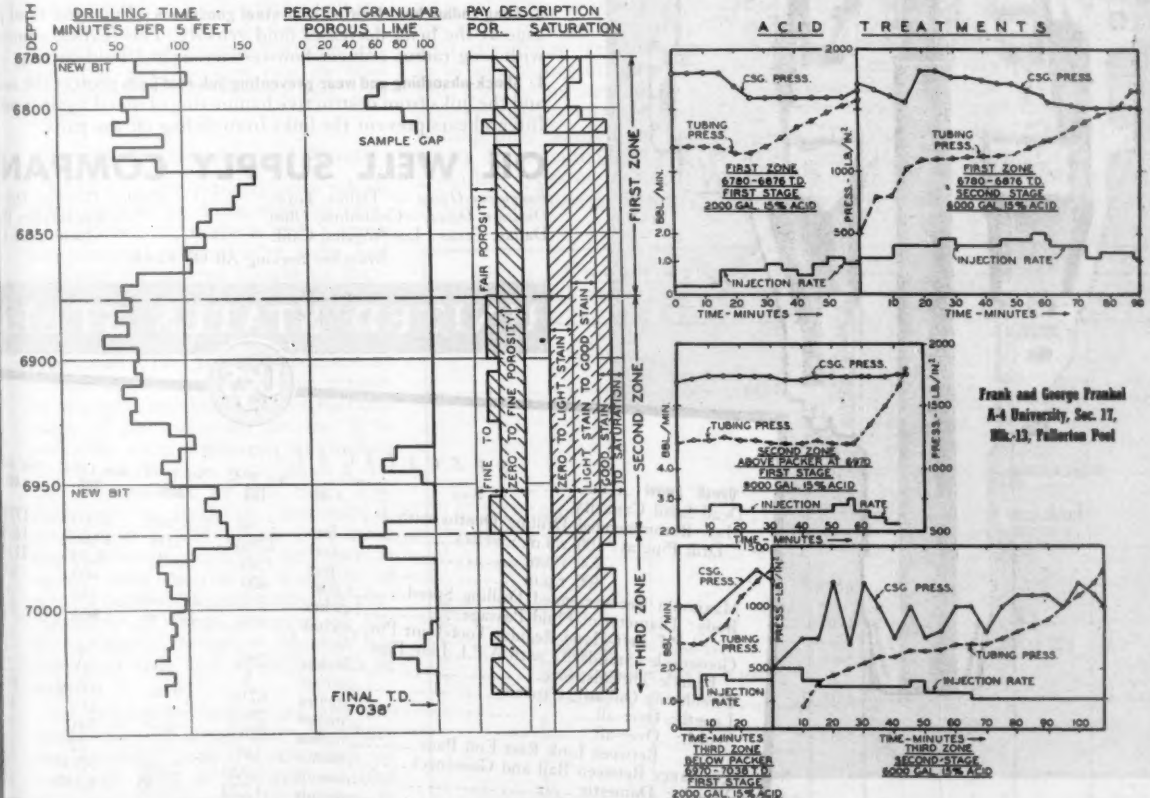
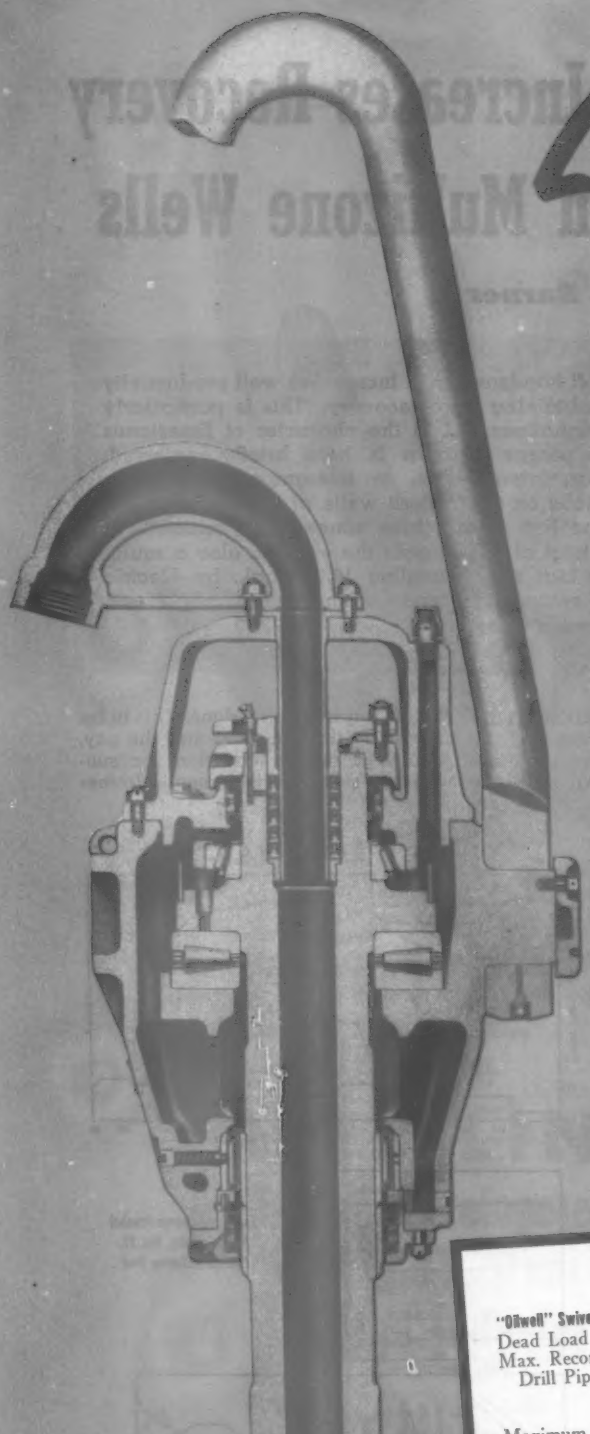

DRILLING TIME MINUTES PER 5 FEET
PERCENT GRANULAR POROUS LIME
PAY DESCRIPTION POR. SATURATION
DEPTH
NEW BIT
SAMPLE GAP
FAIR POROSITY
FINE TO ZERO TO FINE POROSITY
ZERO TO LIGHT STAIN
LIGHT STAIN TO GOOD STAIN
GOOD STAIN TO SATURATION
FIRST ZONE
SECOND ZONE
THIRD ZONE
NEW BIT
FINAL T.D. 7038'
ACID TREATMENTS
CSG. PRESS.
TUBING PRESS.
INJECTION RATE
FIRST ZONE 6780-6876 T.D. FIRST STAGE 2000 GAL. 15% ACID
FIRST ZONE 6780-6876 T.D. SECOND STAGE 8000 GAL. 15% ACID
SECOND ZONE ABOVE PACKER AT 6970 FIRST STAGE 8000 GAL. 15% ACID
THIRD ZONE BELOW PACKER 6970-7038 T.D. FIRST STAGE 2000 GAL. 15% ACID
THIRD ZONE SECOND STAGE 6000 GAL. 15% ACID
TIME-MINUTES
BBL./MIN.
PRESS.-LB./IN.²
Frank and George Frankel A-4 University, Sec. 17, Blk.-13, Fullerton Pool

Fig. 1—A Clear Fork well which tested 1,054 bbl. per day through ¼-in. choke was obtained from acidizing, separately, the three pay zones shown. Five treatments were made, using a total of 24,000 gal. Results: First zone flowed 19 bbl. per hour after 2,000 gal., and 25 bbl. per hour after 6,000 gal. Following 8,000 gal. into second zone, the first and second zones flowed 34 bbl. per hour. After treating third zone with 2,000, then 6,000 gal. acid, final test of all three zones was 44 bbl. per hour through ¼-in. choke



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1. Bearings and lubrication—Heavy-duty full-apex type main th roller bearing is specially designed for its application. A tape roller auxiliary bearing in the housing cap absorbs upward th and takes part of the radial load. A straight-roller radial bea is located at the bottom of the housing. Wide spacing of the bearings carrying the radial load assures maximum stability. bearings are immersed in the circulating oilbath. Grease-lub cated oil seals prevent loss of lubricating oil. Two large weath proof breathers contribute to cool operation.

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Dead Load Capacity	tons	100	200	300	400
Max. Recommended Drilling Depths with 4½" Drill Pipe at: 100 r.p.m.	feet	5,700	8,500	12,500	17,00
200 r.p.m.	feet	4,700	7,000	10,000	14,00
400 r.p.m.	feet	3,800	5,600	8,500	11,00
Maximum Recommended Drilling Speed	r.p.m.	400	400	400	400
Body: Diameter of Fluid Passage	inches	2¼	2-13/16	3½	4
A.P.I. Left-Hand Regular Tool-Joint Pin	inches	4½	5-9/16	6⅝	7⅝
Gooseneck (Standard) with A.P.I. Line Pipe Female Threads, Size	inches	2½	3	4	4
Circulating Oilbath, Capacity	gallons	5	9	15	22
Length: Over-all	inches	67⅛	93⅝	103⅛	109
Width: Over-all	inches	26½	33½	41½	41
Between Link Rest End Pads	inches	20½	26¾	34¼	34
Clearance Between Bail and Gooseneck	inches	14⅞	22	22	24
Weight: Domestic	pounds	1,020	2,850	3,800	5,0
Export	pounds	1,220	3,300	4,530	6,0

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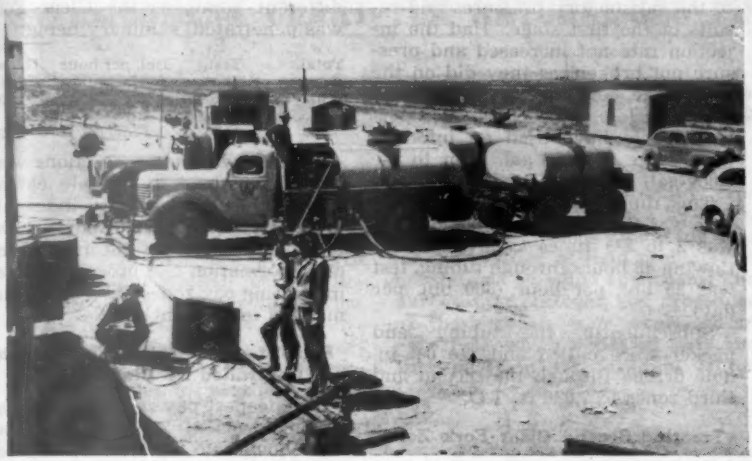


Fig. 2—Continuous record of casing and tubing pressures are being obtained during this multizone acid job of the Clear Fork, Fullerton pool

diately, after the flush and back-wash, production tests can be made in conjunction with bottom-hole pressure or sonic data to find quickly the improvement in productivity index.

Treatments to a well can be made again and again, if necessary, not to one but all of the possible productive intervals, with the improvement in capacity of each zone ascertained, in about the same time that one single tight sand section can be shot with nitroglycerin, cleaned out, and tested.

Porosity Is Irregular and Erratic

Even with the rapidity with which acidizing can be done, and the relatively low cost, there is still a more fundamental reason why lime and dolomite formations should be thoroughly opened and full drainage capacity exposed. This is that these formations, excluding some oolitic types and a few special cases, are as a rule highly irregular and erratic in porous makeup. If formations were of homogeneous nature, it is perfectly clear that acid treatments would result in no more than a little enlargement of the hole, and that only a moderate increase in production would be secured from the uniformly increased diameter. It would take enormous amounts of acid to increase significantly the permeability of large volumes of the homogeneous formation. Muskat[1] has discussed this and allied phases in detail.

In calcareous formations, the extreme case of irregularity is where the porosity may be pictured as openings, such as fissures, solution caverns, cracks—usually sparse—in a massive, dense solid body. If the well does not happen to penetrate these openings, or enough of them which are connected, the resultant productive capacity will be smaller than that possible to achieve with proper acidizing in a good completion. This type of porosity, or texture, has been termed foramenular in the recent discussion of the character of limestone formations by Bulnes and Fitting[2].

The contrasting end of the porosity range, or that opposite to the foramenular type, is where pore spaces are more or less homogeneous, the void dispersion relatively uniform, as in sandstones of uniform texture. This kind of porosity has been called intergranular.[2] The certainty of obtaining only limited increase in capacity from acidizing the true intergranular type of porosity already has been discussed. The possibilities for large improvement of capacity and drainage in the foramenular type are obvious.

A great many productive lime and dolomite formations, as shown by the data of Bulnes and Fitting, lie between (termed "intermediate" porosity) these two extremes, as, for example, those found in the Wasson, Slaughter, Seminole, Foster, Jordan, Goldsmith, Ownby, Monahans (Ellenburger), Russell, Eunice, and Vacuum pools of West Texas and Southeast New Mexico. On the same basis of classification many other important pays, such as the Hunton, Viola, and some of the Arbuckle of the Mid-Continent; the Devonian and Trenton of Illinois; the Dundee-Monroe of Michigan, also lie in the intermediate class.

As to acidizing, just what is the significance of the intermediate porosity classification, in which lie many of the important limes? First, the flow picture is this: there are a few good fluid carriers, fissures, cracks, etc., which are erratically distributed, and to which the well may or may not initially be in adequate communication. Bulk of the pore space and of the oil in the formation, however, lies in the crystalline or intergranular porosity of the so-called ground mass or body of the rock. This often is very fine and tight, but nevertheless connects more or less everywhere with the sparse, erratic, large-sized foramenular or "channel" porosity.

The great percentage of acid forced into such formations will pass through, react with, open up and improve the capacity of the main

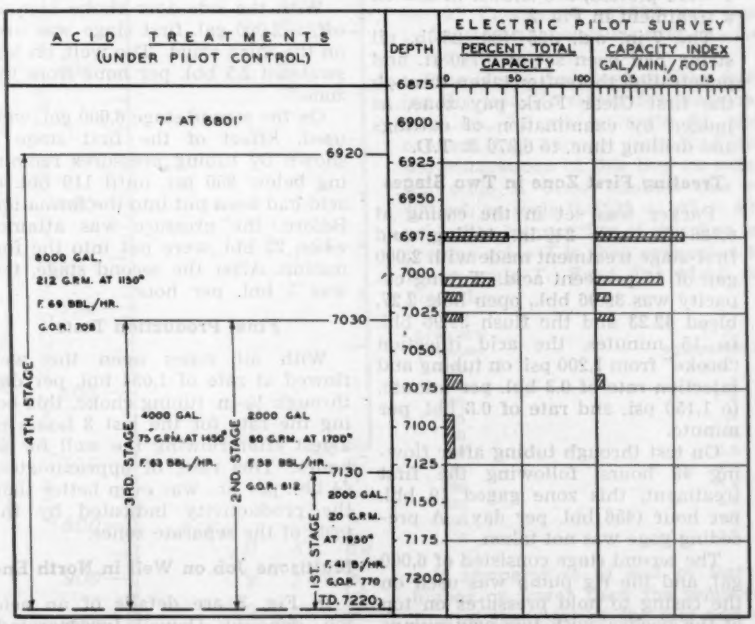


Fig. 3—Electric Pilot was used to find the above formation capacity indices, and then to control, selectively, the four stages which totaled 16,000 gal.; Clear Fork formation

flow channels, and connect some that formerly were isolated. It will not be spent in reacting with all of the formation but just a few feet; it will move back through the channels much farther. This process accounts for the large increases in productivity common to many acid jobs. As such, it can contribute additional economic oil recovery, and often, additional physical oil recovery.

In multizone treating, another important function of acid is to expose and open up sections which have been sheathed or plugged off from production by drilling mud, or water logged by filtrate.

Turning from theory to the practical side, in multizone-multistage acidizing the different mechanical phases involved in getting the work done grow somewhat complex. Good practice, and to take full advantage of all productive zones, requires wide-awake attention of the geologist and engineer in planning the work for the well owner, and a variety of special equipment and careful handling by the acid service company.

The "know how" is important because it can pay off in the ways described. The Fullerton pool[3] of Andrews County, West Texas, is the locale of the two interesting multizone acid jobs described below.

In Fig. 1 are shown the essential data involved in the first well. The sample examination for quality of porosity and saturation was made by Western Co., the acid service used on the well, for guidance preparatory to making the treatments. The recording casing and tubing pressure gages, from which the curves in Fig. 1 were plotted, are shown in use on a treatment in Fig. 2.

The 7-in. o.d. J55-N80, 26-lb. oil string had been set at 6,780 ft. and penetration thereafter taken through the first Clear Fork pay zone, as judged by examination of cuttings and drilling time, to 6,876 ft. T.D.

Treating First Zone in Two Stages

Packer was set in the casing at 6,726 ft. with 2½-in. tubing, and first-stage treatment made with 2,000 gal. of 15 per cent acid. Tubing capacity was 39.96 bbl., open hole 2.27, bleed 42.23 and the flush 39.96 bbl. In 15 minutes, the acid injection "broke" from 1,200 psi. on tubing and injection rate of 0.3 bbl. per minute, to 1,150 psi. and rate of 0.8 bbl. per minute.

On test through tubing after flowing 48 hours, following the first treatment, this zone gaged 19 bbl. per hour (456 bbl. per day). A preceding gage was not taken.

The second stage consisted of 6,000 gal. and the rig pump was used on the casing to hold pressures on top of the packer, with two acid pumps injecting into the tubing. The 6,000-gal. treatment was decided upon due to the satisfactory pressures and results of the first stage. Had the injection rate not increased and pressure not broken, as they did on the first stage, and had the production test been less satisfactory, the operator would have used an intermediate stage of 4,000 gal. prior to the 6,000-gal. stage.

This time, while the tubing pressure was the same, the injection rate was 2 to 2½ times as great. After flowing 48 hours through tubing, test was 25 bbl. per hour (600 bbl. per day).

Subsequently, the tubing and packer were pulled and the 6⅛-in. hole drilled through the second and third zones to 7,038 ft. T.D.

Treating Second Clear Fork Zone

An anchor-type packer, with Otis type G side-door choke installed immediately above, was set at 6,970 ft. in a tight interval between the second and third zones.

Detailed examination of the cuttings (results shown under "Pay Description" in Fig. 1) revealed that the porosity was better developed in the second zone than in the first. For this reason, a single-stage 8,000-gal. treatment was used, and for the same reason, a casing pump was relied upon to hold the acid out of the first zone. At the start of the treatment 40.29 bbl. of oil were bled off the casing, this being only the volume of the tubing.

Following the work, after flowing 48 hours, the well tested 34 bbl. per hour (816 bbl. per day) from the first and second zones.

Third Zone Treated in Two Stages

With the side-door choke blanked off, a 2,000-gal. first stage was used on the third stage. The well, on test, swabbed 2.5 bbl. per hour from this zone.

On the second stage 6,000 gal. were used. Effect of the first stage is shown by tubing pressures remaining below 850 psi. until 119 bbl. of acid had been put into the formation. Before, the pressure was attained when 22 bbl. were put into the formation. After the second stage, test was 5 bbl. per hour.

Final Production Tests

With all zones open the well flowed at rate of 1,054 bbl. per day through ¼-in. tubing choke, this being the rate for the last 3 hours of a test after flowing the well for 48 hours. This rate, of approximately 44 bbl. per hr.. was even better than the productivity indicated by the tests of the separate zones.

Multizone Job on Well in North End

In Fig. 3 are details of an acid job, done by Dowell Incorporated, in a well 5½ miles north of the first. Production tests were made at different points as the Clear Fork was penetrated, summary being:

Total depth	Test, hours	Bbl. per hour for last hour	Gas-oil ratio
7,012	22.5	Flow 51	1,036
7,175	21	Flow 49	....
7,220	17.5	Flow 55	875

In this well, the pay sections were first determined by sample examination, then the capacity index obtained by Electric Pilot survey. Details of the Electric Pilot method and other formation test procedures used in locating pay zones have been summarized in a recent article.[4]

Four-Stage (Selective) Treatments Controlled by Electric Pilot

The deepest pay zone indicated by cuttings was at 7,150-7,175 ft., but this showed no effective or exposed permeable capacity to the hole by the Electric Pilot survey. Accordingly, the first-stage treatment of 2,000 gal. was directed into an interval blanketing this possibility of production.

The second and third stages, of 2,000 and 4,000 gal., were directed again at the lowermost tight section, and also to one higher up the hole which had shown low capacity index per foot by the pilot survey. The fourth-stage treatment, of 8,000 gal., was spread over an interval covering all pay zones.

In each of the four treatments, injection of acid was confined to the desired interval by using the Electric Pilot (interface locator) for control purposes. Production tests showed increases after each treatment. A summary of the work is:

Stage No.	Injection interval (ft.)	Acid (gal.)	Tests after, (bbl./hr.)	Gas-oil Ratio
1	7,130-7,220	2,000	41	770
2	7,030-7,220	2,000	58	612
3	7,030-7,220	4,000	63	....
4	6,920-7,220	8,000	69	708

After the well had been placed on production, a series of gages in conjunction with bottom-hole pressure gage determined the productivity index to be 1.85 (average). In an alternative procedure, the middle zone between two other productive zones could be individually acidized by blanketing off the lower zone with a temporary plug and holding the acid-oil interface at the base of the upper zone.

References

1. M. Muskat, "Flow of Homogeneous Fluids Through Porous Media," (McGraw-Hill), section on Theory of Acid Treatment of Limestone Wells, pp. 420-429.

2. A. C. Bulnes and R. U. Fitting, Jr., "Reservoir Performance of Limestone Formations," Petroleum Technology (A.I.M.E.) TP 1791, January 1945.

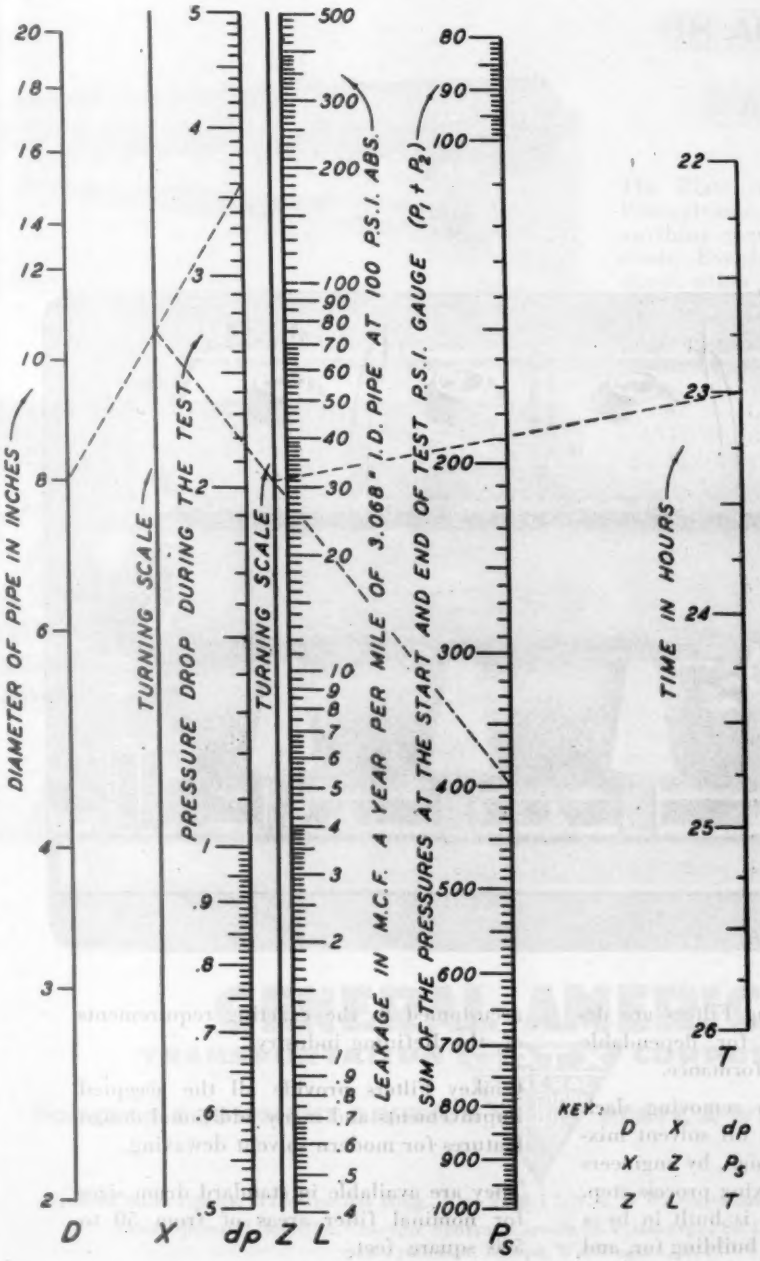
3. K. B. Barnes, "Fullerton Is Guidepost in Development of Clear Fork and Devonian Reserves," The Oil and Gas Journal, June 2, 1945, p. 69.

4. K. B. Barnes, "Six Different Engineering Methods Compared in Study of Pay Formations," Oil and Gas Journal, April 7, 1945, pp. 70-73.

Chart for Pipe-Line Leakage Tests

This is the fourth of a group of five alignment charts prepared by W. D. Parkes, United Gas Pipe Line Co., for the solution of field problems in natural-gas pipe-line operations. The purposes, advantages, and procedure of these charts were explained in an article which appeared with the first chart in the issue of March 17, 1945.

LEAKAGE of gas from pipe lines is a very serious matter. A well-constructed modern line is said to be tight, but even such a line will probably allow a small leakage. Before new lines are put in service, and in many cases after a line has been used for a period of years shut-in pressure-drop tests are conducted in order to measure the gas lost from them. Leakage is generally proportional to the absolute pressure and the area of the inside of the pipe. This is true in nearly all cases where leakage is due to



Equation: $$Y = \frac{10{,}750\ D\ (dp)}{P_s\ t}$$

where:

- Y = leakage in M.c.f. a year per mile of 3.068-in. i.d. pipe at 100 psia.
- D = internal diameter of pipe in inches.
- dp = difference in pressures ($P_1 - P_2$) where P_1 is the absolute pressure in psi. at the start of the test, and P_2 is the absolute in psi. at the end of the test (see table for temperature correction).
- P_s = sum of the pressures.
- t = time in hours.

Example: Required to find the leakage in M.c.f. a year per mile of 3.068-in. i.d. equivalent pipe at 100 psia.

Given: 10 miles of 8-in. o.d. pipe. Time required for pressure drop 23 hours.

	Gage pressure (psi.)	Temp. (°F.)
First set of observations	202	54
Second set of observations	198	53

Solution: First obtain the pressure drop during the test (202 — 198 = 4 psi.). The pressure drop is corrected for change in temperature by subtracting the equivalent pressure for 1° F. change at 200 psi. (see table) from the pressure drop (4 — 0.4 = 3.6 psi.).

Now locate the pressure drop during the test. Corrected for temperature, i.e., 3.6 psi. on scale dp, and connect it to 8-in. on scale D. From the intersection of this line on turning scale X draw another line to 400 psi. on scale P_s (202 + 198 = 400 psi.). The intersection of this line on turning scale Z is then connected to 23 on scale T. Read 31.8 M.c.f. on Scale L.

Line test pressure (psi.)	1° F. equivalent to (psi.)
100	.2
200	.4
300	.6
400	.8
500	1.0
600	1.2
700	1.4
800	1.5
900	1.7
1,000	1.9

If temperature at end of test is higher or lower than the temperature at the start of the test add or subtract the equivalent pressure to the pressure drop during the test.

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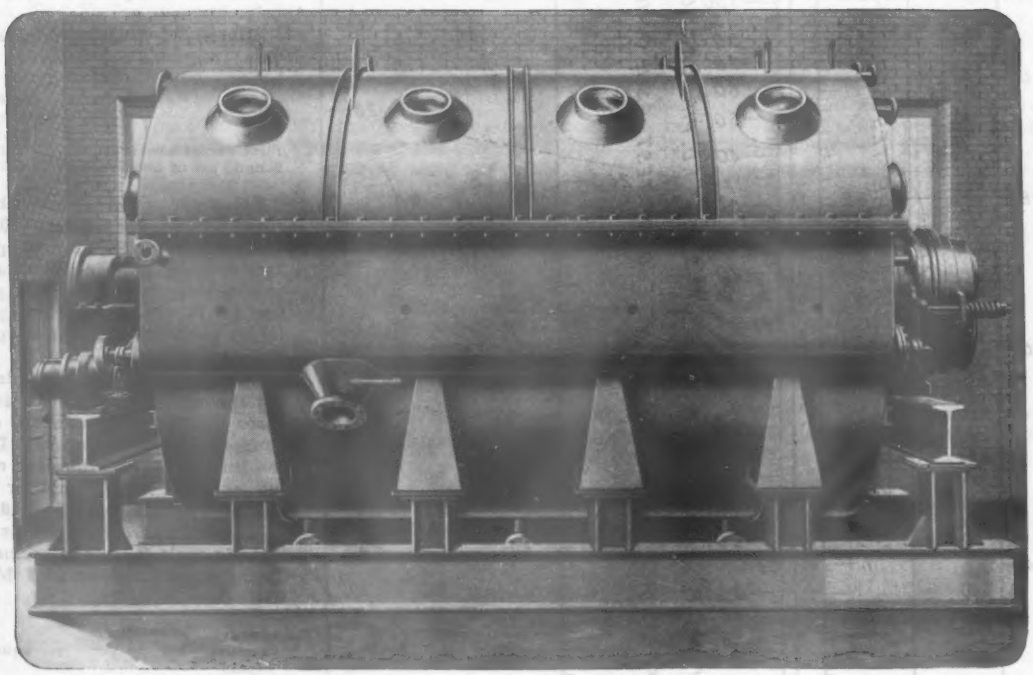

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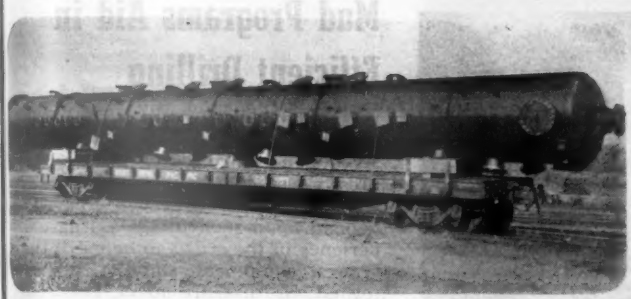

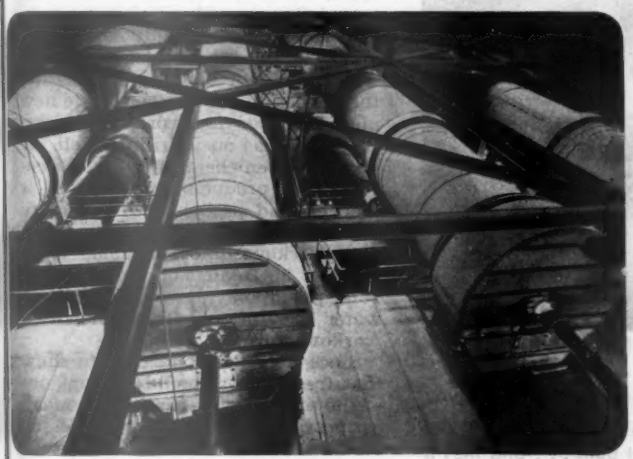

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corrosion or to faulty joints. It would not be true in cases of split pipe, but such cases are not included under leakage, since a break in a pipe results in a blowout which is commonly discovered very quickly.

The U. S. Bureau of Mines in cooperation with the Natural Gas Association of America made very extensive studies of various lines throughout the United States. From these studies they have recommended that a line be considered tight if the leakage does not exceed 50 M.c.f. per year per mile of 3.068-in. i.d. pipe at 100 psi. absolute.

The accompanying chart is to be used when shut-in pressure-drop test are run.

Problem: 1. A new section of 16-in. line has been shut in for a leakage test. From the following observations, will the line be accepted by the pipe-line department?

	Gage pressure	Temp.
First set of observations ...	150	61°
Second set of observations..	147	64°

Time required for pressure drop, 24 hours. Diameter of pipe, 16 in.

Solution: First obtain the pressure drop during the test (150 — 147 = 3 psi.). The pressure drop is corrected for change in temperature by adding the equivalent pressure for +3° F. change at 150 psi. (see table) to pressure drop (3+0.9=3.9 psi.) Now locate the pressure drop during the test corrected for temperature, i.e., 3.9 psi. on scale DP and connect it to 16 in. on scale D. From the intersection of this line on turning scale X draw another line to 297 psi. on scale P. (150 + 147 = 297). The intersection of this line on turning scale Z is then connected to 24 on scale T. Read 82 M.c.f. a year per mile of 3.068-in. i.d. pipe at 100 psia. on scale L. The section will not be accepted since the leakage exceeds 50 M.c.f. per year per mile of 3.068-in. i.d. pipe at 100 psia.

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Mud Programs Aid in Efficient Drilling

(Continued from page 82)

mud, and the differential pressure. As a general rule this differential pressure should be kept as low as considered safe. However, this will depend upon such things as the experience of the crews to be used, the type of equipment, and the type of formations that are to be exposed. It should always be kept in mind that water from the mud, particularly fresh water, probably tends to water-block producing formations, especially partially depleted sands. Therefore careful study should be given to using a circulating fluid which will put the least water into the formation. As a general rule new mud is mixed for workover operations whereas on a drilling well the mud has been chemically treated before the producing formation is reached and probably will produce a reasonably low water loss. The new workover mud in some cases will not be treated or properly dispersed and may have a very high water loss, oftentimes unknown to workover crews.

Since available data tend to show that fresh water should be kept out of the producing formations as much as possible, it cannot be stressed too much that these two steps be carefully considered when making the mud program. First, differential pressure should be kept as low as is considered safe. Second, if fresh-water muds are to be used the water loss should be as low as is economically possible or some type of circulating fluid should be considered which does not use fresh water as the base fluid, for example an oil-base mud.

Workover-Well Mud Program

The well to be worked over is shut in and is loaded with salt water, oil, and gas.

1. Kill well with mud by pumping the fluid in the hole back into the formation and pull tubing.

2. Squeeze off 6,000-ft. sand.

3. Drill to 6,430 or 4 ft. above the water in the 6,400-ft. sand.

4. Complete in the 6,400-ft. sand and set tubing on packer with casing full of mud.

Program

1. Mix 320 bbl. of mud. Refer to Fig. 2 to determine the amount of clay needed. (300 bbl. mud is required to fill the casing. Refer to Fig. 3.)

The clay to be used should be selected from clays on the market that will give the following characteristics. (The operator should name the clay of his choice in the program):

Density—9.4 to 9.6 lb. per gal., or 48.8 to 49.9 psi./100 ft. depth
Viscosity—38 to 42 sec. A.P.I.
Water loss—6 to 7 cc./30 min.
Hydrostatic pressure of mud at 6,000 ft.—3,000 psi.
Bottom-hole pressure of 6,000 ft. sand—2,750 psi.
Differential pressure—250 psi.

2. The formation will be squeezed off. Treat the mud to remove all cement before and while drilling the cement plug (operator should list chemical to be used for treating cement).

3. Before drilling into the 6,400-ft. sand, increase the weight of the original clay mud by using weighting material to give the following characteristics:

Density—9.8 to 10.0 lb. per gal., or 49.9 to 51.9 psi./100 ft. depth
Viscosity—38 to 44 sec. A.P.I.
Water loss—6 to 8 cc./30 min. or less
Hydrostatic pressure of mud at 6,400 ft.—3,264 psi.
Bottom-hole pressure of 6,400 ft. sand—2,976 psi.
Differential pressure—288 psi.

4. Estimated material required for workover operations:

Clay (name type)—350 sacks
Weighting material (list approved weighting materials)—50 sacks
Chemical for reducing viscosity and water loss (name chemical)—500 lb.
Chemical for treating cement (name chemical)—500 lb.

Fire Control at Shell's Wood River Refinery

(Continued from page 85)

flood lights. Along with 400 lb. of A and B foam powder, Lux and foam fire extinguishers and many other minor items, the fire truck's other equipment includes: lineman's rubber gloves, all-service masks, rope, shovels, brooms, buckets, axes, an assortment of pipe and machinist's wrenches, pipe plugs and blind gaskets and safety hats, rubber coats, and respirators.

A hose truck, located in the garage with the fire truck, reports to all fires. This vehicle is equipped with 30 sections of 50-ft. water hose, 20 sections of foam hose, extra nozzles, spanner and hydrant wrenches, and 1,800 lb. each of A and B powder.

Other automotive trucks and cars in the plant are assigned to fire-fighting service which, when a fire alarm is given, report to assigned areas in the refinery. Vehicles operating in such service move portable

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apparatus into its assigned area. Cards attached to the dashboards indicate where each truck or car is to report in the event an alarm is given.

In order that every piece of fire-fighting equipment be ready for instant service, a routine schedule of testing and inspection is adhered to rigidly. This work is done by regularly assigned fire inspectors and it is very rarely that a piece of equipment is found in unserviceable condition during a fire. Semiannually all field piping and hose are tested hydrostatically at a pressure above normal operating pressure. All hose and equipment on portable and quick-acting reels are visually inspected weekly and the doors of all fire houses sealed. Foam pumps are inspected and tested each day and a slippage test is run monthly. The foam system headers are tested with air pressure each month excepting during cold weather. Weekly the foamite tanks are gaged and samples from the contents submitted to the laboratory for testing expansion, gravity, and collapse. Monthly the samples are analyzed to determine the sodium carbonate and sodium bicarbonate content. Foamite extinguishers are cleaned and recharged annually; however, the contents of each extinguisher are tested for expansion semiannually. The 40-gal. foam engines are tested monthly. The carbon dioxide extinguishers are weighed and inspected semiannually excepting during the hot season when a monthly test is made to determine whether any have been emptied due to rupture of the safety disc.

The training of the crews composed of captain, driver and nozzleman, and hydrantman is continuous and takes place daily. In addition, once a month the crew captains are brought together for training in the use of any special equipment, fog nozzles, adapters, and personal protective equipment. Other men are constantly instructed in the operation of the pumps and their valves to the field lines as well as the manipulation of block valves in the foam and water systems.

Ten Fire Zones

The refinery property is divided into 10 fire zones. Maps showing the zone divisions are displayed in various locations throughout the refinery. For easy reference and to minimize loss of time, all automatic telephones are marked with the zone number in which they are located and the number of the fire-alarm telephone is plainly marked in red at the top of the telephone directories as is also the alternative number to call in case difficulty is encountered with the fire alarm telephone which is located in boiler house No. 1. When this telephone is dialed from any of the outlets throughout the plant, a small siren blows and red lights flash in both ends of the boiler house. An extension from this telephone also rings a gong and flashes a red light in the garage so that the driver of the fire truck may listen in and receive the same information as the boiler-house operator. On receiving the alarm, the operator sounds the siren and indicates the zone by short blasts.

Responding to an alarm, 8 of the 12 crews report to the captains in any of the 10 zones: one crew reports to zones 1 or 2 as its regular function and stands by for duty in any of the other zones when called; a second crew which operates similarly reports only to zones 4 and 5. Each of the remaining two crews respectively reports only to zones 1 and 8 but are alerted for duty in any of the other zones when called. A special crew, composed of crews 5, 6, and 7, report to zones 6, 9, and 10 without their reguarly assigned equipment to operate foam towers.

A division of the engineering department, the fire and safety department consists of seven senior inspectors under the supervision of a head fire and safety engineer. How the fire-fighting organization is set up at this refinery is shown by the basic organization chart in Fig. 1.

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Tower Heat Balances

FRACTIONATION in topping plant towers is so relatively simple that the design of a tower resolves itself primarily into the making of heat balances. Heat and oil vapor enter the tower at a high temperature and the various products are withdrawn at lower temperatures, and those products that flow from the side of the tower must be condensed. The determination of the amount of heat that must be removed is known as a heat balance. The products shown in Table 1 are to be separated.

All products of the tower except the bottoms product (topped crude oil) are cooled as vapors. The specific heat of oil vapors was discussed in The Refiner's Notebook No. 42 (May 19, 1945), that of liquids in No. 40 (May 5, 1945), and the latent heat of condensation in No. 43 (May 26, 1945). The temperatures shown on the figure on this page will be discussed in Notebook No. 48 which will appear shortly. The steam used to strip the several products is:

	Lb./gal.	Lb./hr.
Kerosene	0.3	126
Distillate	0.3	336
Topped crude	0.5	1,720
Total		2,182

It is assumed that the steam is available at 400° F. (125-lb. steam with some superheat). The heat that must be removed in order to keep the tower in thermal balance is:

Cool gas	245 (581 — 240) 0.58*	49,000 B.t.u./hr.
Cool aviation gasoline	4,980 (581 — 240) 0.55	935,000 B.t.u./hr.
Cool naphtha	7,230 (581 — 315) 0.56	1,080,000 B.t.u./hr.
Cool kerosene	2,820 (581 — 425) 0.58	255,000 B.t.u./hr.
Cool distillate	7,800 (581 — 490) 0.58	411,000 B.t.u./hr.
Cool steam	2,182 (400 — 240) 0.5	175,000 B.t.u./hr.
Condense naphtha	7,230 × †120	867,000 B.t.u./hr.
Condense kerosene	2,820 × 105	296,000 B.t.u./hr.
Condense distillate	7,800 × 92	717,000 B.t.u./hr.
Cool topped crude	25,725 (581 — 554) 0.72	501,000 B.t.u./hr.
Total reflux heat		5,286,000 B.t.u./hr.

*Specific heat (vapor) was determined at the average temperature of 410° F. The gas was assumed to have a gas specific gravity of 1.0.

†Heat of vaporization is taken at the plate temperature and for materials intermediate between mixed base and paraffin base.

TABLE 1—TABULATION OF PRODUCTS FOR A 4,000-B.P.D. PLANT
(See The Refiner's Notebook No. 31, February 24, 1945)

(1)	(2) Per cent	(3) G.p.h.	(4) A.P.I.	(5) Lb./hr.	(6) Lb./hr.
Loss or gas	1	70		*3.5	245
Aviation gasoline	12	840	67	5.93	4,980
Naphtha	16	1,120	51	6.46	7,230
Kerosene	6	420	44	6.71	2,820
Distillate	16	1,120	37.5	6.97	7,800
Topped crude†	49	3,430	(25.6)	(7.51)	(25,725)
Crude oil	100	7,000	37.0	6.99	48,800

Column 1 shows materials. Column 2 shows percentage (see Refiner's Notebook No. 31). Column 3 gallons per hour is barrels per day times 42 divided by 24. *Column 5 equivalent weight of tail gas is about 3.5 lb. per gal. †Topped crude gravity obtained by dividing pounds left (25,725) by the gallons (3,430).

The 5,286,000 B.t.u. is called the "reflux heat" because it is the amount of heat that must be removed by the reflux or cooling agent that is cycled through the top of the tower. Various means of removing reflux heat will be discussed in Notebook No. 46. The reflux heat must be removed either by cooling water or by heat exchange with the incoming stock.

No more heat than computed here can be removed from this tower unless the feedstock is superheated, i.e., more material is vaporized than the 51 per cent of products that is to be made. Extra or excess vaporization must be condensed by additional reflux and it does not materially alter the temperatures at any points in the tower although the pipe-still outlet temperature will be higher. Obviously, the removal of less heat than the 5,286,000 B.t.u. computed here would not be satisfactory because the products (mainly the distillate) would not be sufficiently cooled and any topped crude oil that is carried by entrainment from the vaporizer would appear in the distillate rather than be washed back into the residue.

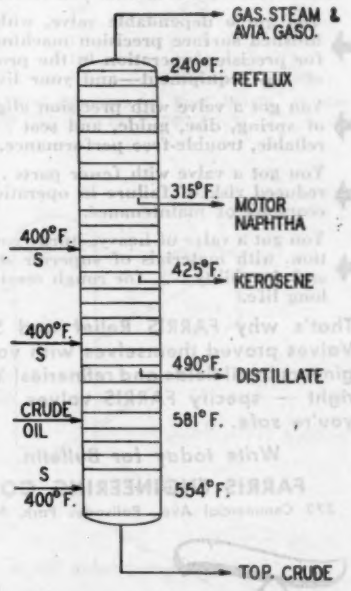

Fig. 1—Products and feeds of a topping tower for making a heat balance

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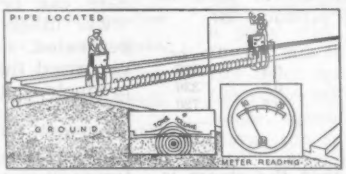

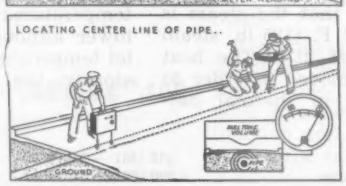

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Methods of Measuring Water Ratios

(Continued)

Extra gage tank method.—In oil fields where production of water is large and where for some reason it is advisable to make numerous measurements of water ratios, it is convenient to set an extra tank in front of the tank battery for gaging individual wells. The tank in most places is set on an elevated platform raised above the gunbarrel tank so that when the gaging is finished the fluids will flow by gravity into the tank battery (Fig. 1). Also a manifold installation with pipe connections running from each well head is set up so that any desired well can be connected into the gage tank at any time by opening and closing the connecting valves. The filling time of the tank is measured with a watch, and the filled tank allowed to stand until the oil, water, and gas have separated. The liquids are gaged in the usual way.

Glass-cylinder method.—The extra gage tank with its elaborate installations is expensive and time consuming. The portable - tank method is somewhat expensive and time consuming. Therefore, many engineers, where accuracy is not important, use cruder, cheaper methods to arrive at estimates of water production that in many cases answer the requirements as well as the more expensive methods. The simplest and quickest way to arrive at estimates, especially where a large number of measurements is needed, is the glass-cylinder method. Glass-stoppered, graduated 500-ml. cylinders are used. It is desirable to provide about 20 flasks in a wooden case constructed with compartments for each flask to prevent breakage. About 1 ml. of aerosol solution is placed in each flask. This chemical reduces the interfacial tension between water and oil and facilitates the more rapid and more complete separation of oil and water. A funnel is provided for each flask and a 500-ml. sample of the fluid produced from each well is collected through an open valve at the well head. In most cases it is preferable to collect five or more samples from each well at intervals of 5 minutes since many wells do not produce uniformly and at times pump off a head of oil, produce mostly water for an interval, and than oil and water again. A funnel is needed and after collecting, the flasks should be shaken to mix aerosol with the fluids and allowed to stand for at least 30 minutes or until complete separation of oil and water has taken place. Then the volume of oil is read by means of the graduations on the side of the flask. These measurements give the per cent of water and per cent of oil produced. If the total volume of oil per day is desired, a small calibrated tank should be provided and the time required to fill the tank measured with a stop watch. This method is, of course, subject to considerable error because the volume of the sample, 500 ml., is so small in proportion to a day's production of 50 to 500 bbl. of fluid. Nevertheless, with care and a little experience, better results than might be expected are obtained. Table 1 shows a comparison of measurements made by this method and those obtained by standard gaging methods.

TABLE 1—COMPARISON OF GAGE MEASUREMENTS AND FLASK READINGS*

	Glass-cylinder method				Gage tank	
Sample No.	Per cent oil	Per cent water	Bbl. oil produced in 24 hours	Bbl. water produced in 24 hours	Bbl. oil measured in 24 hours	Bbl. water measured in 24 hours
1	4	96	15	353	14.74	354
2	20	80	28	114	33.04	153
3	3	97	6	186	9.14	257
4	6	94	15	237	10.08	202
5	4	96	7	185	6.56	227
6	11	89	20	160	16.04	249
7	7	93	13	179	8.18	145
8	23	77	30	102	16.04	249
9	25	75	51	153	42.34	165

*These measurements were made by Dean Brothers of Fort Worth, in the East Texas oil field, and were furnished by Dr. George Fancher.

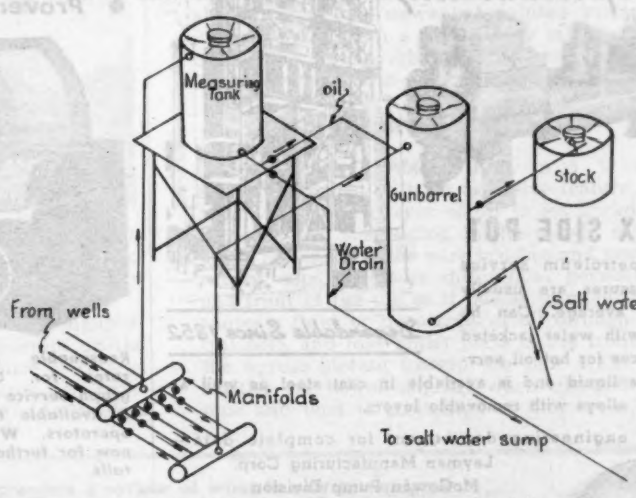
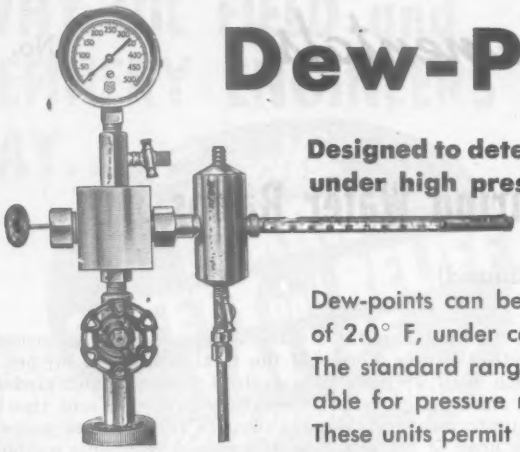


Fig. 1—Sketch illustrating installation of extra tank for gaging oil and water volumes and lease. (After Neptune)

Series prepared by F. B. Plummer, professor, petroleum engineering school, University of Texas



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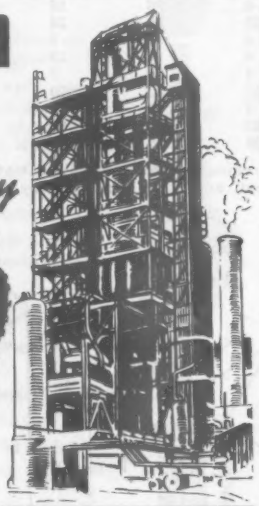

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OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Kenneth B. Barnes

(1) AAF XR-8 HELICOPTER. In this new aircraft Kellett uses a novel synchronized, intermeshing rotor system. Two pairs of rotors, each of three blades, overlap as they rotate in opposite directions. This design eliminates necessity for a tail rotor to counteract torque. Ship is exceedingly maneuverable, having conventional helicopter characteristics of vertical rise and descent, ability to hang motionless in flight at average altitudes and to fly backwards or sidewise, as well as forward.

The first XR-8, which has a fuselage length of 22 ft., rotor span of 40 ft., and empty weight of 2,320 lb., has had one emergency landing—a sudden spring thundershower caused the pilot to decide to land in a cemetery in a heavily built-up suburban area. After setting down until the storm had passed, flight was then resumed without further incident.

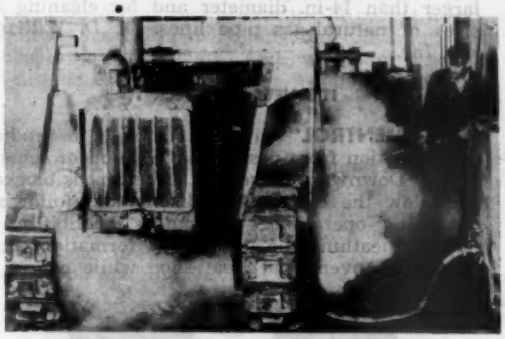
It is emphasized that the XR-8 design is a military experimental type and that the company

is not contemplating a production program on this design, although later commercial models are expected to incorporate the intermeshing, synchronized-blade arrangement.

Kellett is currently engaged on other helicopter projects while continuing its program on the XR-8 with the assistance and guidance of rotary-wing experts of the Army Air Forces Air Technical Service Command at Wright Field. Readers checking this item will be placed on list to receive further announcements. *Kellett Aircraft Corp.*

IT'S NEW CHECK IT

(2) HEAVY-DUTY STEAM CLEANING compound has proved to be particularly effective in removal of heaviest and most stubborn grease and dirt from iron and steel surfaces. Steam-off is extremely powerful in its penetrating and emulsifying ac-



tions, combining quick cleaning energy with maximum ability to soften water. It results in producing reliably clean work, rinsing freely, and leaving no film, curds, water spots, or streaks. Used as a stronger solution, Steam-off has the ability to remove unwanted painted surfaces as it cleans, making it a particularly effective product for complete overhaul or reclamation projects. *Turco Products, Inc.*

IT'S NEW CHECK IT

(3) PIPE LINE CLEANING PIG, in 3 to 14-in. sizes, is provided with an exclusive feature which permits a small stream of oil to jet ahead of it, agitating and suspending in the stream solid deposits loosened by the wire brushes and synthetic-rubber cups. Pressure differential between rear and front of the pig as it moves through the line causes a flow, or bypassing, of oil through a central hole, and four outlet ports in the front direct the bypass stream toward the pipe wall. Brush bristles are bowed slightly when inserted in the pipe and tend to straighten as they wear, main-

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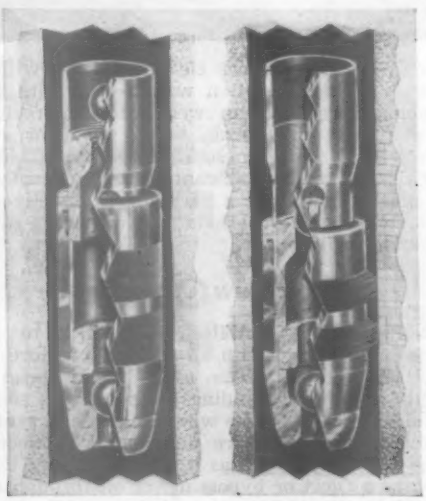
IT'S NEW CHECK IT

taining effective cleaning pressure. Tapered lip of the tough but flexible synthetic-rubber cup is expanded by fluid pressure as its diameter is reduced by wear. Other types of pipe-line pig are available for cleaning crude-oil and gasoline lines larger than 14-in. diameter and for cleaning all sizes of natural-gas pipe lines. *T. D. Williamson, Inc.*

IT'S NEW CHECK IT

(4) "CEMENTROL" prevents damage to producing formation from possible infiltration of cement slurry. Downward movement of cement is blocked off below the casing shoe during and following cementing operations, eliminating possibility of cement sheathing the face of the formation. Acting as a conventional float shoe while casing is



run, when cementing depth is reached, a bakelite ball is pumped slowly down until it comes to rest in the seat of the internal bakelite middle section of the shoe. Through keyhole-shaped slots in the steel body, the middle section is pinned with shear pins to a sliding steel sleeve on the outside. This sliding sleeve is in contact with the packing elements. Pump pressure is continued after the ball has seated, and before a pressure of 300 psi. has been reached the internal bakelite middle will have moved downward, forcing the external steel sleeve downward against the packing elements and expanding them firmly against the hole wall, thus packing off the casing on the outside. Pump pressure is continued until it reaches approximately 850 psi., at which the pin shears and the bakelite moves further downward, opening side ports through which the well is cemented. Slips lock, preventing the external sleeve from moving upward, and the packer remains expanded. Thus no cement is allowed to pass below. The bakelite mechanisms later are easily drilled out. Left illustration shows the shoe as run in the hole; right, after packing element has been expanded to form its outside shutoff. *Larkin Packer Co.*

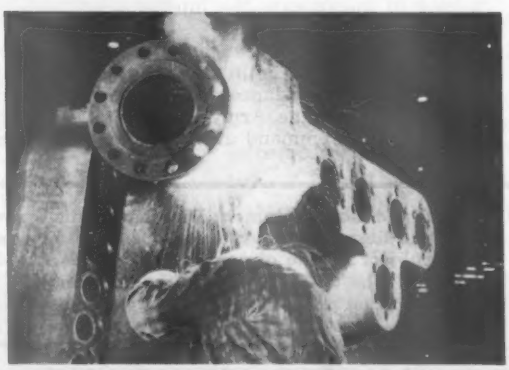
IT'S NEW CHECK IT

(5) TESTING WELDS FOR LEAKS can now be done by a new, fast, and simple method. Product is Kano Kroil, a creeping, penetrating chemical with extremely low surface tension, so it spreads and creeps rapidly. It literally goes everywhere, quickly. Laboratory tests report it penetrates a millionth-inch space. A leading tank and steel

fabricator writes: "We have found Kano Kroil is a perfect way to test the welded seams on steel tanks. Formerly we applied air pressure or filled the tanks with water—both slow and sometimes inconclusive. Now we spray a thin film of Kano Kroil along the seams and even in the most minute openings it quickly penetrates to the opposite side of the seam. It is faster, surer, and more efficient." *Kano Laboratories.*

IT'S NEW CHECK IT

(6) NEW ELECTRODE FOR STEELS. Specially designed for use on carbon-molybdenum steel in the high-pressure piping industry, the General Electric W-56 electrode may also be applied to vessels (fittings) and structural weldments of innumerable kinds. Operates satisfactorily on either A.C., or D.C., reverse polarity, and its range of current is sufficiently broad to cover a wide range of plate



thicknesses. A medium-long arc gives best results with this electrode, which can be used in flat, vertical, and overhead positions. It produces, moreover, a relatively flat deposit, particularly in the vertical position. Gives deep penetration, has excellent creep-resisting qualities. Covering used produces an easily removed, light, friable slag, which sets up fast, thus facilitating proper manipulation of the electrode. Illustration shows the new electrode being used on overhead welding. *General Electric Co.*

IT'S NEW ✓ CHECK IT

(7) FAXFILM DISPLACES PHOTOMICROGRAPHS in many instances. This new method reproduces surface finishes of any material in third dimension for instant comparison with standards for roughness, texture, checking surfaces for cleavage, cracks, porosity, dents, scratches, etc., by any projector. Enlarged 10,000 times, or 100 diameters, Faxfilm is distinct and will show details of the finest irregularities up to 0.0001-in.

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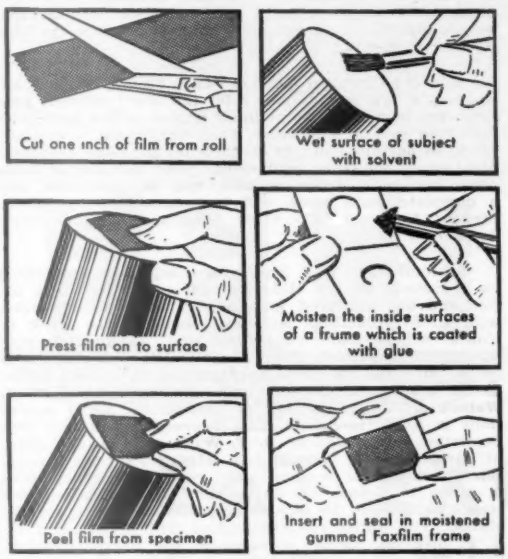
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Press film on to surface
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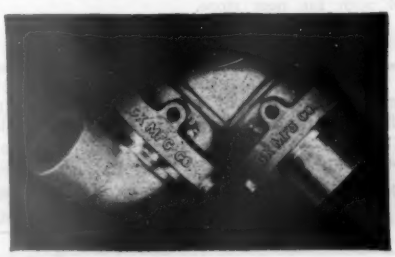
The record of your specimen surface is now made as permanent as the typewritten records in your office and for inspection can be projected immediately. Kits are $15, viewers $5; projectors and twin micro-projector comparators available. *Rex D. McDill, Engineer & Physicist.*

IT'S NEW ✓ CHECK IT

(8) PLASTIC-PACKED SWIVEL JOINT employs an extrudable plastic packing similar to that widely used in high-pressure valves and other oil-country pressure equipment. Use of plastic packing provides complete sealing action for the joints



OIL AND GAS EQUIPMENT Digest — IT'S NEW ✓ CHECK IT

under either pressure or vacuum. A quarter-turn on the packing screws quickly applies additional packing, if needed, to the packing gland. Locking and bearing elements are easily accessible for adjustment or replacement on the job. Joints are immediately available in sizes of 2, 2½ and 3-in. with 1, 2 and 3-way swivels tested for 1,000 psi. for low-pressure service, and 10,000 psi. for high-pressure service. *G-K Manufacturing Co.*

IT'S NEW ✓ CHECK IT

TRADE LITERATURE

(9) LOW TEMPERATURE WELDING ALLOYS. An attractive folder describing following features for this type rods: low bonding temperatures that prevent distortion; less preheating of parent metal required; less after-machining and cleaning; establishes great strength, and works for greater all-around economy. *Eutectic Welding Alloys Co.*

IT'S NEW ✓ CHECK IT

(10) METAL GASKETS. A very complete 40-page catalog covering the broad subject of metal gaskets from every angle. Well illustrated, with pictorial gasket guide, prices, specifications, three-dimensional drawings of different type gaskets, etc. *Akron Metallic Gasket Co.*

IT'S NEW ✓ CHECK IT

(11) FRICTION MATERIAL CATALOG. A very complete treatment of friction materials, including woven, folded and compressed, molded, semi-metallic and full metallic, each made in a number of types and structural modifications to suit specific needs. Includes interesting photographs showing materials in actual use and description of testing laboratories and engineering facilities. *Manhattan Rubber Mfg. Division.*

IT'S NEW ✓ CHECK IT

(12) STEAM TUBE ROTARY DRYERS attractively set forth in eight-page bulletin No. 515 listing typical applications and discussing low-temperature drying, constant-temperature drying, dust collection, recycling, and dry mixing. *Louisville Drying Machinery Division of General American Transportation Corp.*

IT'S NEW ✓ CHECK IT

(13) COLD DRAWN SEAMLESS STEEL TUBING hardness conversion table printed on small usable card. Decimal equivalents of one-sixty-fourth inch to one inch given on reverse side of card. *Michigan Seamless Tube Co.*

IT'S NEW ✓ CHECK IT

(14) PROPELLER PUMPS. Brochure shows representative installations and gives detailed cutaway view of propeller pump designed for large capacity and low head pumping service. *Fairbanks, Morse & Co.*

(15) TURBINE PUMPS, oil lubricated with enclosed impellers described and illustrated in great detail in six-page fold-out bulletin. Two colors used on large illustration of motor-driven turbine pump to reveal outstanding advantages. Sizes and ratings also given. *Fairbanks, Morse & Co.*

IT'S NEW ✓ CHECK IT

(16) VIBRATORY FINISHING SCREED. Bulletin shows in detail a new method of finishing concrete and how the finishing screed provides accurate strikeoff and compaction of concrete in one operation. Can finish up to 6,000 sq. ft. per hour. Improves finishing and saves cement. *Master Vibrator Co.*

IT'S NEW ✓ CHECK IT

(17) TEMPERATURE CONTROL CABINETS illustrated and described in detail in 48-page catalog. Shows an extensive variety of standard models as well as photographs of cabinets and baths built to specifications. Includes general information on mechanical and gravity convection heat transfer and price list. *Precision Scientific Co.*

IT'S NEW ✓ CHECK IT

(18) HIGH AND LOW-TEMPERATURE INSULATION covered fully in 20-page booklet describing plastic materials, flat materials, pipe coverings, anticondensation compounds, etc. Contains reference tables, prices, and is well illustrated and informative. *Eagle-Picher Lead Co.*

IT'S NEW ✓ CHECK IT

(19) WELDED STAINLESS TUBING. Four-page folder giving specifications, physical, and corrosion-resistance properties. Shows available sizes and folder is designed with tab for filing and quick reference. *Carpenter Steel Co.*

IT'S NEW ✓ CHECK IT

(20) HORIZONTAL CENTRIFUGAL PUMPS. A 16-page, folder-size booklet, bound in heavy covers, which gives a concise presentation of important facts concerning a basic advancement in the pumping art, with a comprehensive description and explanation of the resulting equipment and its applications. *The LaBour Co.*

IT'S NEW ✓ CHECK IT

(21) DARCOVA PUMCUPS. Eight pages, fully illustrated, describing a novel and strikingly efficient application for packing pistons of air and hydraulic cylinders. Complete with engineering data and reports of unusual service. *Darling Valve and Manufacturing Co.*

IT'S NEW ✓ CHECK IT

INDUSTRIAL ITEMS

Nelson Electric Manufacturing Co., Tulsa, Okla., was presented the Army-Navy "E" award flag at a ceremony last week at the plant. H. A. Norberg, plant manager, accepted the pennant, which was presented by Capt E. W. Armentrout, Jr., U.S.N.

L. R. Keltner has been named superintendent of the Akron, Ohio, plant of the tire division of The B. F. Goodrich Co.

Robert C. Thumser has been promoted to plant engineer of Monsanto Chemical Co.'s John F. Queeny plant, St. Louis, Mo. **W. C. Durning** was advanced to superintendent of the power plant, and **Norville Predock** to superintendent of maintenance and construction.

Patterson-Kelley Co., Inc., East Stroudsburg, Pa., was recently awarded the Army-Navy "E". The company manufactures heat exchangers, special recompression and decompression tanks and oil coolers. Presentation of the award was made by Capt. R. L. Adams, U.S.N.

The Diamond Alkali Co. and The Harshaw Chemical Co. have organized an affiliate which will be known as Diamond-Harshaw Co. The new company will offer expanded research services and manufacturing facilities for production of preformed catalysts, either pelleted or extruded.

Buckeye Traction Ditcher Co., Findlay, Ohio, announces a new service policy for the Mid-Continent field whereby, instead of maintaining branch offices and parts stocks in several key cities, each dealer will eventually stock an adequate supply of parts for pipe-line trenchers and other Buckeye equipment. The company's Tulsa office and parts depot, as such, will be eliminated, and a complete parts stock will be maintained by Wylie-Stewart Machinery Co., 1400 Exchange Avenue, Oklahoma City.

Schlumberger Well Surveying Corp. has centralized its operations in the Mid-Continent under its Tulsa office and the continued management of R. G. Hamilton with L. A. Allaud as technical assistant. The work in Kansas will be under supervision of C. K. Ruddick, previously of Oklahoma City, where he has been replaced by W. R. Mills. Two new headquarters have been established, the Florida division under management of **M. C. Watson,** with headquarters at Tallahassee, while operations in North Louisiana, East Texas and Arkansas will be under supervision of **R. T. Wade,** with headquarters at Shreveport. On June 1, **J. L. Mathieu,** former general sales manager for the company, relinquished his duties in order to devote his entire time to exploitation and rehabilitation of the Schlumberger company operating abroad. The duties he relinquished will be assumed by **E. F. Stratton,** former manager of the Illinois division. **C. A. Doh** will replace Stratton in Illinois, with the assistance of **H. A. Nystrom.**

Merle J. Trees has been elected to the newly created position of chairman of the board of Chicago Bridge & Iron Co., and **Horace B. Horton** has been elected to succeed the late George T. Horton as president. Horton, formerly vice president and treasurer, will continue to serve as treasurer.

Rhea Brooks, formerly district manager for Mid-Continent Supply Co. at Kilgore, Tex., has established the Rhea Brooks Co. at the same operating center in East Texas and is specializing in pumping equipment.

Jones & Laughlin Supply Co. has opened a store in Crescent, Okla. **Fred Bozeman,** formerly at Russell, Kans., has been transferred to Crescent and made store manager. **H. D. Witt,** formerly at Perry, Okla., will be connected with the new store.

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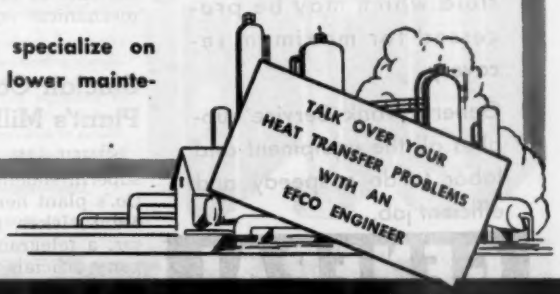

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REFINING

Refiners of District 2 Get Crude-Sharing Directive

CHICAGO.—Twelve refiners in District 2 (Middle West), Petroleum Administration for War, have received directives requiring them to share with 12 other refiners of the district a total of 11,910 bbl. of crude oil daily in June under the wartime allocation plan. Because of duplications in both lists, 19 separate arrangements are involved. The quantity of crude to change hands is the smallest of any month since the plan was adopted early in the war. The program is under direction of the crude-supply panel of the District 2 industry committee.

PAW Issues Safety Guide For Refinery Management

As a safety guide for refinery management and supervisory personnel during the war period, a 175-page manual, "Wartime Recommendations for Refinery Inspections," has been prepared by the facility security division of Petroleum Administration for War.

The manual, which contains 57 pages of charts, diagrams and illustrations in addition to text, is not intended for equipment subject to state or federal Government regulations, such as marine equipment, power boilers, or other apparatus specifically defined by —. "It is simply a compilation of good practice procedures in inspection, and it is not mandatory in any way."

The manual is divided into four sections—Process Equipment, Electrical Equipment, Instruments and Fire Prevention Equipment. Under the heading of electrical equipment, the care of prime movers and other mechanical equipment is discussed.

Sinclair Congratulated on Plant's Millionth Gallon

SINCLAIR, Wyo.—M. H. Nolan, superintendent of Sinclair Refining Co.'s plant here, received from Harold L. Ickes, petroleum administrator, a telegram congratulating company officials and employes on production of the plant's millionth barrel of 100-octane aviation gasoline on Memorial Day. The telegram:

"With considerable pleasure I have learned that the Sinclair refinery at Sinclair, Wyo., will make its millionth barrel of 100-octane aviation gasoline on Memorial Day. This excellent achievement merits the highest praise and I join in extending heartiest congratulations to you and to all the employes of Sinclair Refining Co., who have made this impressive contribution to the war program."

"The Petroleum Administration for War salutes you," said a similar message wired by Ralph K. Davies, deputy administrator.

Billionth Gallon of Gasoline Finished at Jersey Plant

BATON ROUGE.—Workers at the Standard Oil Co. of New Jersey's refinery here paused for a brief ceremony June 1 to deliver the symbolic billionth gallon of aviation gasoline to Maj. James F. Collins, representing the nation's fighting airmen. Major Collins holds the Distinguished Service Cross and the Distinguished Flying Cross for gallantry in the Pacific fighting.

A special guest was Maj. Gen. Troy H. Middleton, commander of the Eighth Army Corps, now on leave at his home in Baton Rouge. Middleton, cited by Gen. George Patton for valorous leadership, was commandant at Louisiana State University when Collins was a member of the cadet corps.

The Baton Rouge refinery is the second in the nation to reach the billion-gallon mark in finished high-octane gasoline, the first was another affiliate of Standard Oil Co. (New Jersey), Humble Oil & Refining Co., Houston, which achieved

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the distinction last December. The Baton Rouge refinery has in addition manufactured the components of high-octane to be shipped for blending purposes at other refineries. This combined with the finished product, sends its production well over the billion-and-a-quarter mark.

Most of the Baton Rouge refinery's equipment and processes have been turned to the manufacture of war products. Figures recently released in Washington show that one out of every 15 planes used in all theaters of combat have been fueled with gasoline produced at the Baton Rouge refinery.

Prewar research in laboratories at the Baton Rouge refinery made it possible for volume production of war essentials—butadiene, Perbunan, buna-S, butyl rubber—to begin within an amazingly short time after war was declared. Baton Rouge's destination as the "cradle of the synthetic-rubber industry" in the United States resulted from pioneer experiments begun here in 1931 by Standard Oil Co. of New Jersey.

Strikers at Gulf Refinery Return to Their Jobs

PORT ARTHUR, Tex.—Operations were resumed at Gulf Oil Corp.'s refinery here May 31 after some 3,500 workers voted to end their 4-day strike. The strikers, members of International Oil Workers Union (C.I.O.), reached their decision about an hour before a regional War Labor Board ultimatum was to go into effect. The walkout followed the suspension of a pipefitter.

Petroleum Administrator Harold L. Ickes had sent a telegram to both the refinery superintendent and the union urging settlement of the trouble and saying: "The strike has resulted in extremely serious losses of petroleum products vitally needed for prosecution of the war. It has completely upset transportation facilities needed for shipment of vital war products."

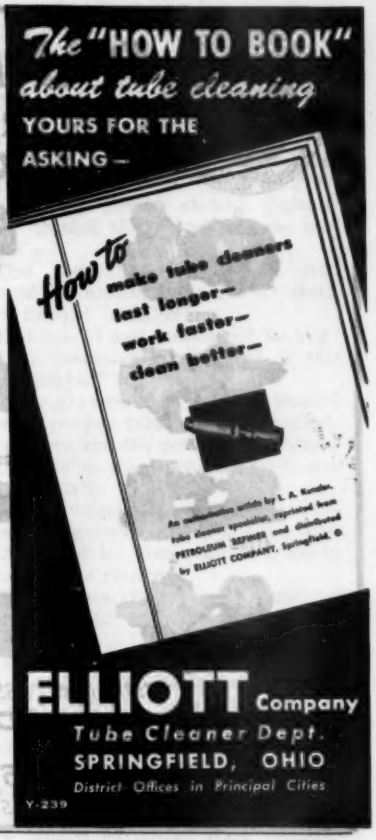
Inquiry for 1,500,000 Bbl. Of Lubricants Reported

CHICAGO.—An inquiry for 1,500,000 bbl. of lubricants for lend-lease in the third quarter of 1945 is reported to have been received by suppliers. Comment in the trade indicates doubt concerning the possibility of filling such an order, probably the largest in history.

Refiners say the market already is extremely tight by virtue of continued excess of demand over the capacity of sources of supply material, and the inquiry is expected to tighten conditions further.

Uses to which the lubricants will be put are not named but it is assumed much will find its way into relief and reconstruction work in continental Europe and elsewhere.

In view of the fact that lend-lease to Russia recently has been ordered curtailed, the size of this inquiry is arousing exceptional interest as to its disposition.



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Heavy duty. Resistant to acids and oils, made from Du Pont neoprene. These gloves are Army specification rejects but positively serviceable for industrial use.

95¢ per pair in dozen lots

IMMEDIATE DELIVERY
SIZES 10-11-12

ALSO AVAILABLE . .

Medium weight. Wrist length (10½") Neoprene Latex Gloves—irregulars. Oil and Acid resistant. For industrial use. Sizes 7 to 9 in half sizes.
Sizes 9½ to 11 • 35¢ per pair in doz. lots

25¢ per pair in dozen lots

RUBBER GLOVE COMPANY OF AMERICA

18 MURRAY STREET • NEW YORK 7, N. Y.

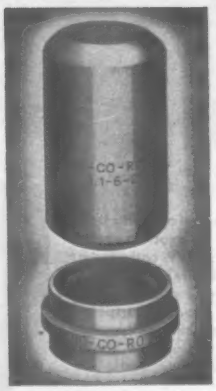
A 20-YEAR RECORD
OF ALMOST...

Unbelievable

SAVINGS!

NO-CO-RO DROP SEAT

In a well that used 10 balls and seats a month the No-Co-Ro DROP and Seat operated *six months* without replacement. In another well, formerly pulled once a week, the DROP and Seat operated eight months. In still another, the DROP and Seat gave *18 months'* service compared to less than a month's service given by balls and seats. Need we say more to any operator interested in reducing costs, improving production records and conserving critical materials?



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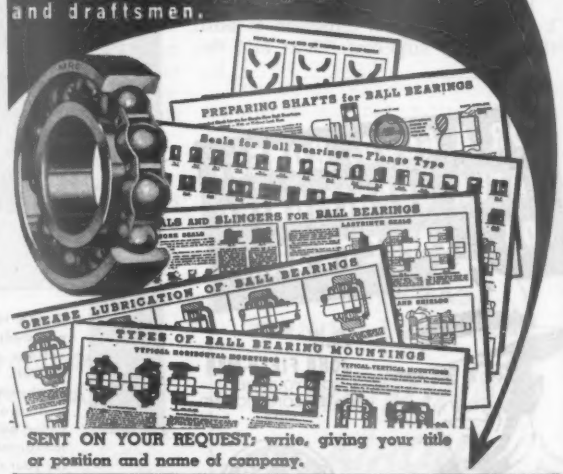
27 BULLETINS on
Ball Bearings—their use, maintenance and installation. Available to shop men, maintenance men, engineers, designers and draftsmen.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SENT ON YOUR REQUEST: write, giving your title or position and name of company.

M-R-C BALL BEARINGS

MARLIN-ROCKWELL CORPORATION

Executive Offices: JAMESTOWN, N. Y.

Natural Gas

E. L. Hall Goes to A. G. A. As Secretary-Coordinator

NEW YORK.—Edwin L. Hall has resigned as manager and treasurer of Manchester Gas Co., Manchester, N. H., to join American Gas Association as secretary-coordinator of its gas-production research committee, of which P. T. Dashiell, of Philadelphia, is head. In his new post Hall will supervise gas-production research activities of institutions and plants where projects sponsored by the committee are undertaken.

A 1924 graduate of Ohio State University with a bachelor of metallurgical engineering degree, Hall has spent his entire business career in the gas industry and has had extensive operating experience with various gas-production processes.

In 1936 and continuing to 1940, Hall was in charge of the development of a large engineering laboratory at Chester, Pa., for United Gas Improvement Co., besides supervising the appliance laboratory. He joined the Manchester Gas Co. in 1940.

Hope Plans to Increase Its West Virginia Facilities

WASHINGTON. — Hope Natural Gas Co. has filed applications with Federal Power Commission for authority to construct and operate additional facilities in West Virginia as follows:

1. Installation of absorbers, deethanizer, still, condensers, heat exchangers and other equipment to increase the capacity of the company's Hastings gasoline plant in Wetzel County. Estimated cost is $300,000. The proposed installation will increase the output of liquefied petroleum products, particularly butane and propane. Petroleum Administration for War has informed the commission that it is "extremely anxious to increase" production of these fuels for war, industrial and other essential uses.

2. A 1,000-hp. gas compressor, with auxiliary equipment, at the Cornwell compressor station in Kanawha County. Estimated cost is $87,958.

3. A natural-gas dehydration plant and appurtenant facilities, having a daily capacity of 40,000,000 cu. ft. of natural gas, at the Stonewall Jackson compressor station in Kanawha County. Estimated cost is $35,000.

Hearings on the three applications, which have been consolidated, will be held June 11.

Turner Valley Gas Utilized In Making Fertilizer

CALGARY, Alta. — Utilizing 9,000,000 cu. ft. of Turner Valley gas, the local plant of Alberta Nitrogen Products is manufacturing 75 tons of ammonium nitrate fertilizer daily, following its partial diversion from munitions production. The plant, with an original rated capacity of 100 tons of nitrogen products daily, has been turning out 230 tons, and has about 400 employes. The plant is owned by the Dominion Government, and will be operated for a few years after the war to meet the serious need for fertilizers.

PAW Asked to Allow More Butane Gas in Texas

WASHINGTON.—Five oil and gas operators of Texas—Elmer L. Atkins, Fort Worth; William J. Lawson, Austin; A. A. Pickens, Tyler; H. G. Wendland, San Angelo, and H. R. Walker, Houston — appeared before Texas members of Congress last week urging support in a move to get Petroleum Administration for War to allow an increase in production of butane gas for Texas farm families.

Committee Tells Governor Oil and Gas Inseparable

AUSTIN.—Oil and gas are inseparable and must be regulated together, Gov. Coke Stevenson's advisory committee of 13 asserts in a charter of state policy recommended to him last week. The committee adopted resolutions and a statement of principles, defining its opinion concerning the spheres for state and federal regulation.

Resolutions adopted recommend that the state's view be presented to Federal Power Commission through the State Railroad Commission and industry representatives and that the governor appoint another committee to coordinate evidence and argument presented in Texas' behalf before FPC, which soon will begin hearings on natural-gas conservation, to determine, among other things, whether federal regulation should be broadened.

A sound policy should include these things, the Governor was advised.

The federal Natural Gas Act should be amended to clarify state and federal jurisdictions.

End use of gas should not be regulated "because competition is the best arbiter."

Flare gas produced with oil should find a proper place in the market. Operators and the commisson should cooperate in marketing all such gas economically available.

Some wasteful production practices made necessary by the war can and should be discontinued quickly when peace returns.

Exploration for oil and gas can be promoted best by competitive effort.

Producers should develop cycling and repressuring projects.

The field of interstate commerce in oil and gas should be left to federal jurisdiction.

Production, processing, gathering, compressing and selling oil and gas before it enters interstate commerce are within exclusive state jurisdiction. In fixing prices, FPC should be required to recognize the price paid in the field under bona fide arm's-length contracts.

State regulations should prevent physical waste, provide ratable taking, fix proper gas-oil ratios, require recycling and repressuring where warranted, and limit production to market demand.

WPB Removes Curbs on Use of Carbon Black

WASHINGTON. — Limits on the use of carbon black in tires, tubes and other rubber products will be removed June 15, War Production Board announced last week. After that date carbon black may be used in various products as permitted prior to February 10, when restrictions were imposed because of short supply. Removal of restrictions, the agency said, indicates the improved conditions.

At the same time WPB limited production of inner tubes for trucks to keep tire and tube supplies in balance and to meet military demands.

According to testimony at a recent hearing in Washington on the shortage of carbon black, the restrictions on its use in tires, reduced the potential mileage of tires for civilian use as much as 30 per cent.

WHY DO 3 JOBS TO GET ONE DONE?

A Practical Suggestion to Users of Steel Pipe Protection . . .

In an operation as important as pipe protection, it takes time and costs more money to order coatings from one source, wrappings from another and application from still a third.

You benefit in every way by letting Pipe Line Service take care of *all* these details, in connection with mill or railhead coating and wrapping.

Thus you have only one order to write. You save time, trouble and money. There is no divided responsibility—no chance of slip-ups. You get full satisfaction on every coating and wrapping job.

That's why it will pay you to call in PLS pipe protection specialists on your next job.

Write for descriptive bulletin.

COMPLETE is the Word for Pipe Line Service

- Coating and Wrapping
  - —At the Mill
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Pioneers in Steel Pipe Protection

General Offices and Plant—
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Glenwillard, Pa. • Longview, Texas
Corpus Christi, Texas and Harvey, La.

PIPE LINES

Texas-California Line Considered by PAW

Application of the Pacific War Emergency Pipe Line, Inc., for permission to construct a pipe line from west Texas to Los Angeles, Calif., was considered last week by the pipe line subcommittee of District 3 supply and transportation committee, Petroleum Administration for War.

Proponents of the project were denied a permit for its construction in 1944, and since then have conferred with the PAW with the result that the recent meeting was scheduled.

At the outset it was agreed that the hearing would concern itself solely with the need for the line as a war measure, and the availability of crude to supply the line. Construction of the proposed pipe line from west Texas to Los Angeles, Calif., received the unqualified endorsement of Olin Culberson, chairman of the Texas Railroad Commission.

Appearing before the pipe line subcommittee of the District 3 as a witness for the Pacific War Emergency Pipe Line, Inc., Dallas, Chairman Culberson declared that the west Texas pools were capable of producing far more oil than is now permitted under proration rules.

"I believe that the line to the Pacific Coast should be built regardless of whether it is by these applicants or somebody else," Culberson said. "I further think that we should look at it as a war measure and not be worried about cost even though it should be dug up after the Japs are licked and used as a horse trough."

As to the availability of crude in West Texas, Culberson testified that the commission's figures showed that 713,162 bbl. daily could be produced, whereas the present proration figures are 500,017 bbl. daily. The proration figure, he said, was based largely upon the amount of oil which could be taken by the pipe lines serving that area at present.

The variance between figures compiled by the Texas commission and the PAW came up for discussion. Culberson interposed the statement that "despite all of the reports I feel sure that West Texas can safely produce more oil than is now being produced."

Presenting the witnesses were Angus G. Wynne of Dallas, president, and Gilbert Weiss of St. Louis, attorney for the Pacific War Emergency Pipe Line, Inc.

Testimony that between 4 and 6 months would be required for construction of the line, and that because of the small rainfall in the territory to be traversed the time of year would not make a great deal of difference in the construction work, also was introduced.

Wynne told the committee that he had assurance that 10,000 bbl. daily additional West Texas crude could and would be refined. He also told the committee that he would submit in writing, data regarding California refineries which could use the crude.

In addition to the subcommittee, which was headed by T. E. Swigart, president of Shell Pipe Line Co., Inc., and consisting of Burt E. Hull, president Texas Pipe Line Co.; E. R. Turner, vice president, Pan American Pipe Line Co.; E. O. Buck of Royal Pipe Line Co., and Charles Fitzgerald, Fort Worth, Sinclair Pipe Line Co., several representatives of PAW were in attendance including George A. Wilson, Washington, director of the supply and transportation division; D. F. Sears, chief of the facilities division, with headquarters in Washington; W. M. Arevill, director of District 3, and Harry Leyendecker, director of transportation for District 3.

Swigart said that the subcommittee will make its recommendation to the supply and transportation committee of District 3 who in turn will make recommendations to PAW.

It was pointed out that at present the only means of transporting oil to the Pacific Coast is by rail tank car and tanker vessels.

Hugoton Line Transferred To Cities Service Gas

Federal Power Commission last week authorized the Cities Service Gas Co. to acquire the 231-mile Hugoton 26-in. natural-gas pipe line which extends from the vicinity of Guymon to Blackwell, Okla., and other equipment.

The acquisition is to be made from Cities Service's affiliate, Cities Service Transportation & Chemical Co.

Cities Service Gas Co. will: (1) Purchase from Empire Gas & Fuel Co., its parent, for $3,000,000 cash the transportation company's

outstanding capital stock, consisting of 30,000 shares having a par value of $100 per share; (2) liquidate the transportation company, whose only function is to own the facilities involved, acquire its assets at their recorded cost less depreciation and assume its liabilities, and (3) redeem the transportation company's debt to Empire in the amount of $7,200,000.

Congress Agrees on Cole Act Extension

The House concurred in a Senate amendment and sent to President Truman legislation extending until July 1, 1946, the Emergency Pipe Line Act.

The act was passed originally to expedite the construction of pipe lines. It would have expired on June 30, 1945, without the extension.

The Senate amendment limited the additional period to 1 year. The House had voted a 2-year extension.

Utah Finances New Pipe-Line Projects

Utah Oil Refining Co. last week registered with the Securities and Exchange Commission 198,828 shares of $5 par value common stock as an initial step in financing the construction of a $4,500,000 pipe-line project for extending and enlarging the capacity of its system.

After the registration becomes effective, Utah Oil will supplement the $1,784,873 net proceeds from the sale of stock with a $3,200,000 loan from banks in Utah, Colorado and Illinois to build a 10-in. crude-oil pipe line from Rangely oil field, Rio Blanco County, Colorado, to the Wamsutter station, Wyoming, on the main line of the pipe line from Hunton Junction, Wyo., to Salt Lake City.

The amount not needed for construction costs will be used for general corporate purposes.

The shares are to be offered to stockholders at the rate of 1 for each 6 presently held and 1/6 of a share for each 1 owned in excess of a multiple of 6.

Standard Oil Co. of Indiana, Chicago, holder of 75.2 per cent of Utah Oil's outstanding common stock, will take 149,523 5/6 shares at $9 each as soon as the registration statement becomes effective and will pay $1,345,714.50 to Utah Oil for the stock within 30 days thereafter.

Panhandle Eastern To Refund Preferred

Panhandle Eastern Pipe Line Co. is reported to be planning to take steps to refund its $13,846,000 of 5.6 per cent preferred stock.

Panhandle's debt is outstanding at a low rate and is not expected to be affected by refunding of the senior stock.

Earnings for the 12 months ended March 31, 1945, were 3.98 times interest charges and preferred dividends and covered preferred dividends alone nearly eight times over.

On the basis of prevailing market conditions Panhandle probably could save nearly one-third of its senior dividend requirements by refunding the preferred stock.

C. S. FOREMAN COMPANY
General Contractors
PIPE LINES
20 West Ninth Street
Kansas City, Missouri

BUCKEYE MODEL 12 digs more trench in less time, at lower cost. Digs trench 15" to 24" wide — up to 5½' deep.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye
TRENCHERS, SHOVELS, CRANES
BACKFILLERS, TRACTOR EQUIPMENT

NEW MAP
Jacobson's Map Showing Natural Gas Pipe Lines of the United States
Size 48" x 75" Scale 1" = 40 Miles
REVISED AND UP-TO-DATE
Jacobson's Map Showing Crude Oil and Gasoline Pipe Lines of the United States
Size 48" x 75" Scale 1" = 40 Miles
Post cards giving complete information and prices of above maps sent on request.
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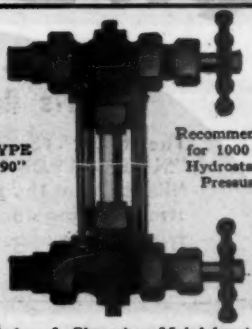
PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



Made of Chromium-Molybdenum alloy temperature resisting steel, extra heavy throughout and stainless steel trimmed. Positive automatic shut-off; stainless steel balls shut off the flow of liquid if glass breaks. Regrinding removable seats, heavy duty stuffing boxes, union connections. Conform with A.P.I.—A.S.M.E. requirements.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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WHEN YOU WANT THE BEST IN PIPELINE CONSTRUCTION
Oklahoma CONTRACTING COMPANY
DALLAS, TEXAS
SOUTH AMERICA
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CARACAS, VENEZUELA

W. C. NORRIS

Rod Line Equipment

ROLLER BEARING
Rod Line Carriers

TOP MOUNTING
Insert Type also available.

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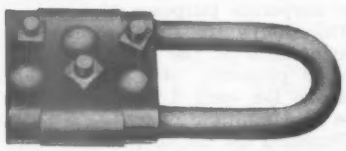


Common Malleable 4-Bolt
Safety Hooded Malleable 4-Bolt
Safety Hooded Malleable 6-Bolt

WOOD SHEAVE
Roller Rod Line Carrie

INSERT TYPE

EXPERIENCE BUILDING OIL TOOLS SINCE 1882

W.C. NORRIS MANUFACTURER, INC.

TULSA, OKLAHOMA

BRANCHES
HOUSTON, KILGORE, ODESSA, TEXAS. SALEM, ILLINOIS
West Coast Distributors:
REPUBLIC SUPPLY COMPANY OF CALIFORNIA, Los Angeles

DISTRICT OFFICE:
Republic Bank Building, Dallas
EXPORT OFFICE: New York City

BUY WAR BONDS

FOR VICTORY

Exploration and Drilling

Week's Highlights

MISSISSIPPI has settled down to the status of a full-fledged oil state with definitely great future possibilities that will be realized only after a long and sustained wildcatting program. Having reached that stage, it is naturally developing its own particular characteristics.

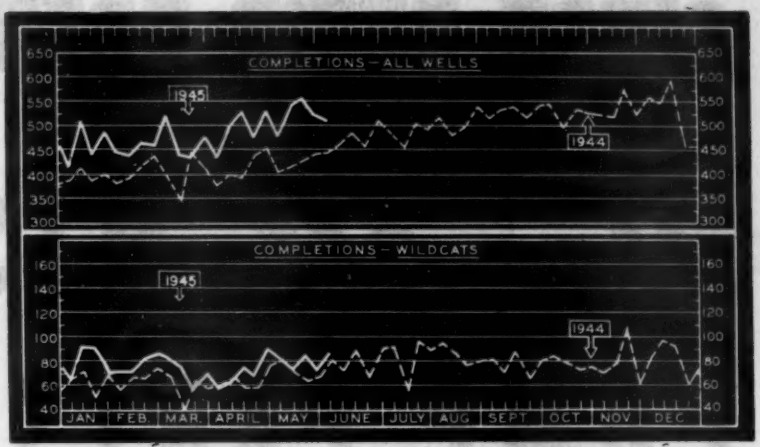
The Mississippi wildcatting pattern is peculiar, in that at first glance there appears to be no discernible geographic trend. This is because to date at least, none of the usual regional structural characteristics have been found. Instead there is a large basin area, in which salt domes, usually deep-seated, form local structural traps, scattered at random throughout the basin.

These domes can be found by geophysical methods at exploration costs that thus far have not proven too costly. Therefore, independent operators are just as active as the major companies. A recent check showed that of 39 wildcat operations, 19 were by independents, 20 were by major companies, and that they were scattered over 25 counties.

Since overall exploration problems are never too easy, while local structural traps can be located relatively easily, the other phases develop complications. These local structures are often badly faulted in an extremely complex manner. The usual radial faults are present, but so are both grabens and horsts. This complicates the selection of a location for testing a given dome.

The problem of picking a potential producing horizon also gives trouble. At present, short of a drill-stem test, none of the conventional methods yields results that can be automatically interpreted in clean-cut fashion. There is considerable vertical variation in permeability, porosity, and saturation of the reservoir sands, as well as complete facies changes from sand to shale and vice versa.

Drill-stem tests show that the surface appearance of cores is often misleading, and the same uncertainty holds true of electric logging, since the resistivity curve sometimes indicates the reverse of what appears to be good saturation, at other times running true to form.



Solid line charts current weekly completions, service wells in Eastern area included

COMPLETIONS IN ALL FIELDS . . .

Week ended June 2, 1945

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1945	1944
New York	13	0	*13	26	35,883	‡537	‡633
Pennsylvania	43	5	†32	80	144,220	‡1,556	‡1,428
West Virginia	1	9	2	12	39,351	‡323	‡339
Ohio	7	11	6	24	57,004	338	382
Indiana	1	0	3	4	8,273	69	87
Kentucky	9	0	2	11	21,663	158	252
Illinois	14	0	15	29	77,620	656	673
Michigan	4	1	9	14	31,750	309	243
Kansas	15	3	18	36	112,953	652	697
Nebraska, Missouri, Iowa	0	0	0	0	0	12	15
Oklahoma	20	1	20	41	175,928	982	660
Texas:	71	6	52	129	585,315	2,980	2,171
North Central	19	0	19	38	101,264	854	588
West	29	1	9	39	196,366	801	640
Panhandle	3	1	1	5	15,080	229	76
Eastern	1	2	4	7	43,986	129	134
Gulf Coast	16	2	10	28	190,000	692	410
Southwest	3	0	9	12	38,619	275	323
Louisiana:	26	5	9	40	301,014	408	307
Northern	10	4	3	17	97,903	135	115
Southern	16	1	6	23	203,111	273	192
Arkansas	7	0	0	7	28,655	74	80
Mississippi	7	0	0	7	39,829	143	43
Southeastern States	1	0	3	4	16,390	20	14
Montana	1	0	1	2	4,437	128	165
Wyoming	1	0	0	1	4,640	84	66
Colorado-Utah	0	0	0	0	0	13	13
New Mexico	2	0	1	3	11,534	196	170
California	38	0	3	39	145,170	969	799
Total United States	279	41	189	509	1,841,628	10,807	9,187
Total previous week	288	37	196	521			
Total June 3, 1944	224	45	187	‡456			

Service wells included: *13; †30. ‡Includes input wells.

..... for more efficient slush pump performance

Use all MISSION PUMP PARTS

MISSION *Super-Surfaced* PISTON RODS

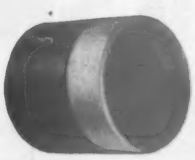
Around an extra high strength core, with a tensile strength of 120,000 pounds, and exceptionally high ductility, Mission Piston Rods have a File Hard case developed by Mission's special combination of heat treatment and rod material. Then Mission adds a **super-surface** which increases the wearing qualities by two to four times. Mission Super-Surfaced rods stay smooth even when salt or brackish wash water is used.

MISSION *Fluid End* PISTONS

"Change the Rubbers and Save the Piston."

Mission piston rubbers, because of tough rubber compound and advanced design, are extremely long wearing and trouble free. But even when the rubbers are finally worn, you don't have to throw away the entire piston. Simply remove the rubbers and replace them with new ones, at the rig, without even removing the piston body—and you are ready for another long run at a fraction of the cost of a new piston.

MISSION *Self-Sealing* GLAND PACKINGS



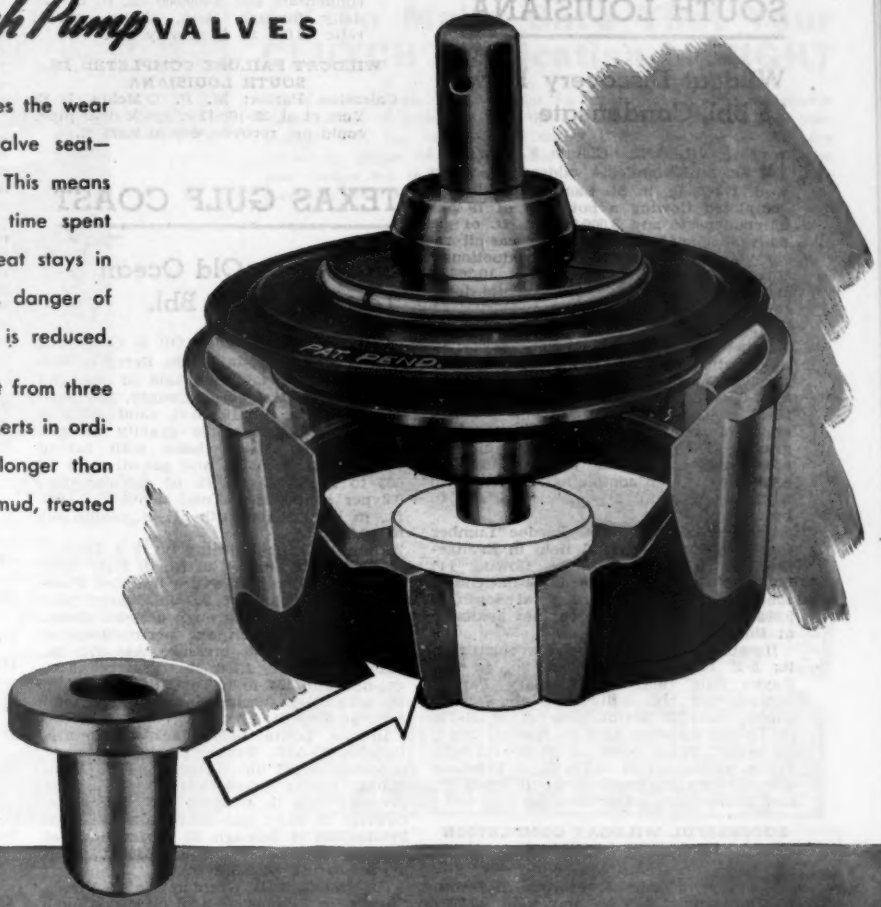
use only pump pressure to tighten the packing automatically during the pressure stroke—just enough to insure a perfect seal. They run free on the return stroke, when tight packing is not needed. As a result, Mission Packings seal perfectly all the time with a great reduction in packing and rod wear.

MISSION *Slush Pump* VALVES

A small replaceable bushing takes the wear instead of the more expensive valve seat—greatly increasing valve seat life. This means lower replacement costs and less time spent changing valve seats. Since the seat stays in the pump longer without removal, danger of washouts between seat and deck is reduced.

New, Compound-308 Inserts last from three to five times as long as regular inserts in ordinary mud, and up to ten times longer than ordinary oil resisting inserts in hot mud, treated mud, or oil and gas.

PULL THE BUSHING *and* SAVE THE SEAT



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Mission

5A—4

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SOUTH LOUISIANA

Wildcat Discovery Flows 75 Bbl. Condensate

NEW ORLEANS.—Claude F. Morgan 1 Frank Dimmick, wildcat discovery well, 173-7s-4e, in St. Landry Parish, was completed flowing a potential of 75 bbl. of condensate and 3,000,000 cu. ft. of gas daily through a ⅛-in. choke, gas-oil ratio 40,000 to 1, gravity 58°. Production is through 24 holes perforated at 10,368-74 ft. Top of sand at 10,290-380 ft. Total depth 10,414 ft.

Sohio Oil Co. is completing the 4-B Lutcher-Moore Lumber Co., 28-6s-12w, at Mystic field in Beauregard Parish, through perforations at 8,491-96 ft. and 8,498-8,508 ft. On drill-stem test at 8,491-96 ft. well had flowed 285 bbl. per day on ¼-in. choke, gas-oil ratio 900 to 1, gravity 45.6°, tubing pressure 750 lb., and additional perforations were made from 8,498-8,508 ft. for completion. Total depth is 8,538 ft. with 5½-in. casing set to bottom.

Continental Oil Co. 6 Pardee Lumber Co., 19-4s-1w, at Reddell field in Evangeline Parish, was completed flowing 144 bbl. per day through a 13/64-in. choke, tubing pressure 2,850 lb. Total depth is 9,898 ft. Production interval not available at this time.

Humble Oil & Refining Co. completed its 8-E Miami Corp., 43-16s-9e, in the Bayou Sale field of St. Mary Parish, flowing 397 bbl. daily through 5/32-in. choke from 72 perforations at 10,131-143 ft. Tubing pressure 1,675 lb., gravity 36.1°, no water. Total depth is 10,780 ft. with 5½-in. casing set to 10,770 ft. A previous test through perforations at 10,628-55 ft. had flowed salt water and gas.

SUCCESSFUL WILDCAT COMPLETION IN SOUTH LOUISIANA

St. Landry Parish: Gas-condensate discovery: Claude F. Morgan 1 Frank Dimmick, 173-7s-4e, top sand 10,290-380 ft., TD 10,414 ft., perforations 24 holes from 10,368-74 ft, PT 75 bbl. condensate and 3,000,000 cu. ft. of gas daily through ⅛-in. choke, gas-oil ratio 40,000 to 1, gravity 58°.

WILDCAT FAILURE COMPLETED IN SOUTH LOUISIANA

Calcasieu Parish: M. P. O'Meara 1 E. Yust et al, 28-10s-12w, stuck drill pipe, could not recover, dry at 8,471 ft.

TEXAS GULF COAST

Stanolind's Old Ocean Test Flows 589 Bbl.

HOUSTON.—Stanolind Oil & Gas Co. 1 E. J. Gracey, in Battle, Berry & Williams Survey, on west side of the Old Ocean field, Matagorda County, has been completed in the 10,100-ft. sand. Well is flowing 589 bbl. of 38°-gravity oil per day through ¼-in. choke with tubing pressure of 1,090 lb., and gas-oil ratio of 693 to 1, 409,000 cu. ft. of gas per day, 0.2 per cent water. Total depth is 11,062 ft., in hard shale, with 5½-in. casing set to 10,970 ft.

Humble Oil & Refining Co. 3-B Tucker, in Fred Eule Survey, at North Katy field in Harris County, flowed a Railroad Commission potential of 95 bbl. daily, plus 12 per cent water, through a ⅛-in. choke. Production is from six perforations at 6,620-21 ft. Tubing pressure was 875 lb., casing pressure 1,160 lb., gravity 40.3°, gas-oil ratio 504 to 1. Total depth is 6,878 ft., with 5½-in. casing set to 6,873 ft., and 2-in. at 6,560 ft.

In the Lolita field, Jackson County, Humble 32-A L. Ranch, flowed a 24-hour potential of 227 bbl. oil through a 3/16-in. choke, tubing pressure 1,100 lb., casing pressure 1,650 lb. with 0.1 per cent water. Gravity is 26.7°, gas-oil ratio 1,854 to 1. Production is through 32 perforations at 5,287-91 ft. Total depth is 5,350 ft., with 5½-in. casing at 5,348 ft.

Humble 42 C. B. Granbury in A. Viesca Survey, in Livingston pool of Polk County, has been completed for a potential of 532 bbl. of 36.2°-gravity oil daily through a ¼-in. choke. Tubing pressure is 850 lb., with 1,175 lb. pressure on casing. Gas-oil ratio 500 to 1. Production is from perforations with 80 shots from 7,000-7,020 ft. Drilled to 7,104 ft., the test was plugged back to 7,055 ft. for completion.

Magnolia Petroleum Co. and Atlatl Royalty Co. 1 Hinchcliff-Sims, a wildcat deep test in J. W. Lutz Survey 90, 7 miles north of Cleveland in San Jacinto County, was dry at total depth of 11,078 ft. No shows of interest were reported.

A new producer for the Lane City pool of Wharton County has been completed by General Crude Oil Co. in its 5 Security Bank & Trust Co., in S. Castleman Survey, which flowed a potential of 125 bbl. of 24.8° gravity oil daily through ¼-in. choke, tubing pressure 550 lb. and gas-oil ratio 1,230 to 1. Production is from perforations at 5,343-65 ft. Total depth is 5,488 ft. with 5½-in. casing set at 5,487 ft.

SUCCESSFUL WILDCAT COMPLETION IN GULF COAST OF TEXAS

Wharton County: Gas discovery, Egypt area, Alexander Edgar Sur., Abs. 93, 1 mi. NE of Egypt, TD 4,012 ft., PT dry gas well, tubing pressure 1,200 lb., casing pressure 1,020 lb., on ¾-in. choke.

WILDCAT FAILURES COMPLETED IN GULF COAST OF TEXAS

Brazoria County: P. H. Pewitt 2-A R. C. Storris et al, in Jared E. Groce 5 Lge. Grant, 8 mi. SE of Angleton, dry at 1,386 ft.

Harris County: Texas Gulf Producing Co. 1 Mary L. Ingersoll et al, WCRR Sur., Abs. 1423, dry at 7,685 ft.

J. M. Huber Corp. 1 East Texas Oil Co., Victor Blanco Sur., 6 mi. SE of Humble, dry at 5,096 ft.

Jackson County: Salt Dome Oil Corp. 1 S. G. Drushell et al, Carlos Lasso Sur., Abs. 40, 5 mi. SW of Edna, dry at 6,257 ft.

San Jacinto County: Magnolia Petroleum Co. and Atlatl Royalty Co. 1 Hinchcliff-Sims, in J. W. Lutz Sur. 90, 7 mi. N of Cleveland, dry at 11,078 ft.

Tyler County: Atlantic Refining Co. 1 Rice Institute, J. T. Freeman Sur., 6 mi. east of Hillester, 4 mi. W and little S of Spurger, dry at 9,510 ft.

DAILY AVERAGE PRODUCTION FOR WEEK

	June 2 crude oil	Distillate, allied products	June PAW quota all oils	May 26 crude oil
Alabama	450	.....	400	450
Arkansas	79,900	5,000	85,000	80,000
California	937,750	60,200	1,007,200	940,150
Colorado	11,250	.....	10,500	11,100
Eastern	62,800	6,400	70,600	64,900
Illinois	200,800	12,000	212,000	197,600
Indiana	11,600	.....	13,000	12,800
Kansas	258,800	4,100	278,100	275,100
Kentucky	28,500	2,200	30,200	27,500
Louisiana	370,050	42,500	402,500	370,000
North Louisiana	70,250	.....	.....	70,250
South Louisiana	299,800	.....	.....	299,750
Michigan	46,850	700	47,700	46,600
Mississippi	51,850	.....	53,000	49,800
Montana	23,150	300	23,300	23,150
Nebraska	900	.....	1,000	900
New Mexico	104,150	5,000	110,000	103,700
Oklahoma	385,900	28,000	398,000	385,700
Texas	2,176,150	163,000	2,333,000	2,176,150
East Texas	379,800	.....	.....	379,800
East Central Texas	138,200	.....	.....	138,200
North Central Texas	153,900	.....	.....	153,900
Texas Panhandle	90,000	.....	.....	90,000
West Texas	495,300	.....	.....	495,300
Southwest Texas	355,650	.....	.....	355,650
Gulf Coast	563,300	.....	.....	563,300
Wyoming	102,200	3,100	116,600	102,450
Total United States	4,653,050	332,500	5,192,100	4,868,050
Change from previous week	down 15,000			

Total production January 1-June 2, 1945 ..... 731,477,650 bbl.
Same period last year ..... 691,940,011 bbl.

SOUTHWEST TEXAS

Goliad County Discovery Has 218-Bbl. Potential

CORPUS CHRISTI.—A new oil discovery 15 miles north of Goliad and 2 miles south of the Slick field, Goliad County, is the Transwestern Oil Co. 1 Wm. Altman Estate which flowed a potential of 218 bbl. of oil per day through 5/32-in. choke. Tubing pressure 925 lb., casing pressure 1,300 lb., 0.6 per cent water. Gas-oil ratio 650 to 1. Production is from perforations at 7,640-50 ft.

Continental Oil Co. 7 G. W. Allen, Slick-Wilcox field, Goliad County, in Obid Marshall Survey, on 24-hour potential test flowed 233 bbl. of oil through 10/64-in. choke, tubing pressure 1,050 lb., casing pressure 1,600 lb., with 0.1 per cent water, gravity 35.8°, gas-oil ratio 656 to 1, from 36 perforations at 7,555-61 ft. Total depth is 7,583 ft., with 5½-in. casing at 7,582 ft.

In North Rincon field, Starr County, Lockhart & Co. 9 J. F. B. Heard, in Survey 545, flowed 192 bbl. of 45.5°-gravity oil, no water, through 11/64-in. choke per day. Tubing pressure 550 lb., casing pressure 725 lb., gas-oil ratio 425 to 1. Production is from 48 perforations at 4,370-78 ft. Total depth is 4,386 ft., with 5½-in. casing at 4,386 ft.

R. D. Farish 2 Sugarland Industries, Inc., in Boyle field, east extension, Starr

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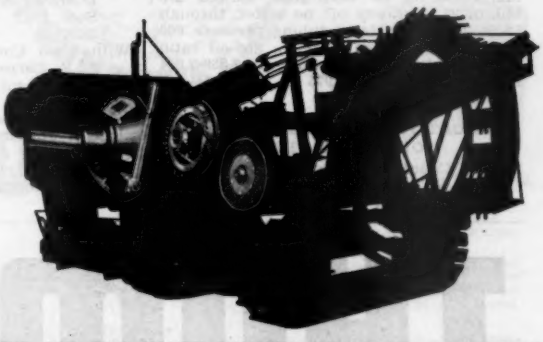

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County, Porcion 92, Share 1-B, was dry at total depth of 4,109 ft.

Pan American Production Co. completed two wells in the Willamar field of Willacy County. Its 3 T. G. Garcia flowed 247 bbl. of 31°-gravity oil through 12/64-in. choke, no water, on 24-hour potential test, tubing pressure 350 lb., casing pressure 1,150 lb., gas-oil ratio 401 to 1, from 640 perforations at various points from 7,854 to 7,988 ft. Total depth is 7,990 ft. with 5½-in. casing at 7,988 ft. Its 2 Maria Garcia de Rodriguez, flowed 218 bbl. of 31.7°-gravity oil, no water, through 12/64-in. choke, daily, tubing pressure 600 lb., casing pressure 1,100 lb., gas-oil ratio 390 to 1, from perforations at 7,858-7,964 ft. Total depth is 7,975 ft. with 5½-in. casing at 7,974 ft.

WILDCAT FAILURES COMPLETED IN SOUTHWEST TEXAS

Dimmit County: Calatexia Oil Co. 1 Eardley, E. A. McCorquadale Sur., 5 mi. NW of Carrizo Springs, dry at 1,744 ft.

Duval County: J. W. Gorman 1 J. Alanis, M. Alanis Sur. 20, 11 mi. SE of Freer, dry at 4,510 ft.

McMullen County: Santa Clara Oil Co. et al 1 Volney M. Brown et al, R. H. Brown Sur., Sec. 8, dry at 6,315 ft.

Nueces County: Southern Minerals Corp. 1 A. M. Stone, Hoffman Petronvilla Ranch, Roberts and White subd., Sec. 15, dry at 8,475 ft.

San Patricio County: Guldrus Drilling Co. 1 Brown & Cochran, A. Herron Sur., Sec. 1, 2 mi. E of Sinton, dry at 7,197 ft.

Williamson County: Wilson Harding and F. B. Carroll 1 J. E. Lane, T. E. Shell Sur., 6 mi. E of Coupland, dry at 1,935 ft.

V. E. Nicholson 1 Theo. Schwenke, Joseph Jordan Sur., ½ mi. S of Coupland, dry at 1,775 ft.

Zapata County: A. E. Weiderkehr 1 Maria T. G. Garcia, Charco Redondo Grant, 1 mi. NW of Charco Redondo, dry at 852 ft.

San Patricio County: Southern Minerals Corp. 1 Katherine Clifton, M. P. J. and N. Delgado Grant, 2 mi. NE of Mathis, dry at 5,215 ft.

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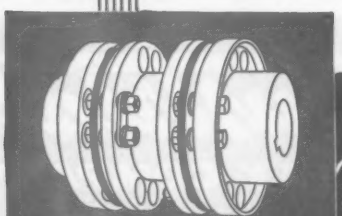

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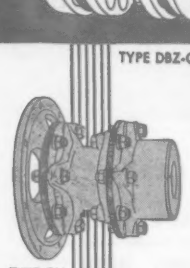

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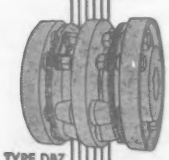

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APPALACHIAN FIELD

New Gas Discovery Looms For Eastern W. Va.

PITTSBURGH.—A potential gas field at the farthest east location ever found in West Virginia is indicated by the performance of Ohio Oil Co. 1 Kaemmerling in Tucker County, on the edge of the Maryland panhandle. The well, on the Blackwater Anticline in the Dry Fork district, was shut down at 8,048 ft., after considerable mechanical trouble. Recently to secure fuel for a second test nearby, mud was removed, and in spite of the hole being in bad shape, 1,500,000 cu. ft. of gas flow was developed, with a pressure of 3,200 lb.

In Wayne Township, Armstrong County, about 5½ miles due east of Templeton on the Allegheny River, Victory Oil & Gas Co., drilling a test on J. H. Matear farm, struck the Tiona sand at 2,742 ft. and 1 ft. in the sand the hole filled up 800 ft. with oil in 6 hours. It was shut in for test. The hole was carrying about 75,000 cu. ft. gas from the Thirty Foot sand at 1,400 ft.

In Braxton County, Philadelphia Oil Co. completed 7,732 Ed. L. Boggs good for 60 bbl. per day from the Big lime, total depth 1,558 ft. It is located near spotty production in Birch district.

In Pleasants County, Dinsmoor & Co. are completing a test on Eliza J. Adams in McKim district which filled up 400 ft. with oil in 24 hours from a depth of 1,692 ft.

CALIFORNIA

Interest in Northwest Picking Up

LOS ANGELES.—Practically all California major operators are at present viewing with interest developments in the northwest country and two have made commitments to undertake exploratory work. Standard Oil Co. of California, which some time ago completed extensive leasing, will start drilling late in 1945 or early in 1946. The Texas Co. will have the bit going ahead in its Clatskanie, Oregon, wildcat within the next 2 weeks. Union Oil Co. has long had this region under consideration. The Sharples Corp. recently concluded work on a wildcat near Aberdeen and while the hole was dry, some interesting possibilities were logged, and the company has announced it has spudded another test immediately, with a third to be drilled at another location this summer.

The Richfield Oil Corp. has announced that it already has 7,500 acres under lease in the vicinity of Portland, Oregon, in connection with its action in seeking leases on 3,000 acres of county owned land, plus 1,600 acres owned by the City of Portland. O. T. Atwood et al have a wildcat drilling in NE 8-24s-32e, north of Lake Malheur, in Harney County, Oregon, reported making hole at 3,000 ft.

Shell Oil Co., Inc.'s deep tests in the Long Beach field have reached the critical depth, 48-A Alamitos at 12,519 ft. and 1 Stakemiller-Rose at 11,054 ft. Mechanical difficulty is retarding work on 135 Reyes, deep test at Dominguez at

12,455 ft. and Superior Oil Co.'s two outpost wells in the Paloma field are testing at 12,171 and 12,364 ft. Both are on extended production tests flowing about 250 bbl. daily. The eastern outpost of Western Gulf Oil Co. on the Los Angeles Athletic Club lease failed to come up to expectations in the lower sand and is preparing to test the Paloma sand of Miocene age. Standard of California has reentered the Semitropic gas field for another deep test and has resumed drilling following the landing of surface pipe, 206 ft. of 11¾-in. The company's first deep test in this field failed to show commercial production although some favorable indications were found.

WILDCAT FAILURES COMPLETED IN CALIFORNIA

San Luis Obispo County, Cuyama: H. L. Norris 1 Cuyama Ranch, 25-11n-23w, bottomed in barren gray sand, no important showings, TD 1,730 ft.

Ventura County, Owensmouth: Tide Water Associated 1 Triunfo, 12-1n-18w, bottomed in barren gray sand of Cretaceous age, no important oil or gas showing, TD 3,240 ft.

Santa Barbara County, Los Alamos: Southern California Petroleum Co. and J. I. Anderson 3 Archambeault, 16-7n-32w, bottomed in fairly hard gray sand, swabbed sulfur water, PB 1,674 ft. bailed dry, no oil or gas showing, TD 1,816 ft.

N. CENTRAL TEXAS

Humble Stakes 6,000-Ft. Wildcat in Foard County

WICHITA FALLS. — Mid-Continent Petroleum Corp. 1 T. L. Burnett, wildcat 6 miles north of the Johnson pool in Foard County, is dry at 6,825 ft. in shale, after running electrical survey. Humble Oil & Refining Co. has staked a 6,000-ft. wildcat 10 miles southwest of Thalia in Foard County. It is 1 Furd Halsell, 2,260 ft. from the north line and 1,980 ft. from the west line of the north half of Section 266, Block A, H&TC Survey.

Cooke County.—The Texas Co. 1 Murrell, northeast outpost to the company's Ellenburger discovery in northeast Cooke, northwest of the Walnut Bend pool, was completed for 69 bbl. of 31.4°-gravity oil. Top of pay is at 5,505 ft. Total depth is 5,949 ft. Texas 1 Buckley, wildcat 15 miles northeast of Gainesville, logged hard lime with streaks of stain from 7,655-77 ft. On a 40-minute drill-stem test from 7,669-7,719 ft., recovery was 1,410 ft. of water. Another drill-stem test will be run. Total depth is 7,800 ft. in lime. Sun Oil Co. 1 Mable Field, 1-mile south outpost to the Sivell's Bend Pool, is drilling below 6,032 ft., in shale and lime.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT

Clay County: New oil pool—Continental 1 A. E. Thomas, Blk. 34, Freestone CSL, 2 mi. N Newport, elev. 1,081 ft., plugged back to 4,250 ft., pumped 33 bbl. day, perf. 4,130-50 ft. Strawn, gravity 37°, Ellenburger 6,920 ft., TD 7,106 ft.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: C. L. Abercrombie and Frank Wood 1 C. L. Abercrombie, Blk. 82, Harris subd., 6 mi. W Archer City, elev. 1,060 ft., dry, TD 1,390 ft.

R. W. Darden 2-B W. H. Thomas, Lot 5, N subd. of Nathan Thomas Sur. A-454, 3 mi. W and 1 mi. N Archer City, dry, TD 1,470 ft.

Clay County: Donley Suddath 1 Dan Oster, Lot 74, Parker CSL, 3½ mi. SE Petrolia, dry, TD 341 ft.

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Stanolind 1-A Cray, Sec. 2801, TE&L Sur. A-531, 3 mi. S. Bellevue, Ellenburger 7,065 ft., dry, TD 7,133 ft.

Cooke County: Nu-Enamel 1 Montie C. Wilson, B. J. Thompson Sur. A-1006, 5 mi. SE Myra, Ellenburger 2,132 ft., dry, TD 2,290 ft.

Throckmorton County: Bridwell 1 Christina McKeichen, E. E. Hull Sur. A-2116, 11 mi. SW Throckmorton, dry, TD 742 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Brown County: B. C. Mann 1 L. O. Goss, Sec. 10, BBB&C Sur., 3 mi. SE Rising Star, dry, TD 883 ft.

Stephens County: Texas & Pacific 1 D. R. Wright, Sec. 1165, TE&L Sur., 5 mi. S Eliasville, Barnett 4,422 ft., Mississippian 4,511 ft., dry, TD 4,545 ft.

EASTERN TEXAS

Shelby Co. Test Has Distillate Show

DALLAS. — M. E. Davis 1 Pickering, wildcat in the W. J. Brittian Survey, 6 miles east of Patroon, Shelby County, on a 20-minute drill-stem test from 3,633-3,638 ft. recovered 200 ft. of gas-cut mud with considerable distillate. A drill-stem test from 3,633-43 ft. showed 400 ft. of gas and distillate-cut drilling mud. On a drill-stem test from 3,633-48 ft. 380 ft. of gas and distillate-cut drilling mud was recovered. It was drilling below 3,648 ft. Humble Oil & Refining Co. 1 Pickering in the Huxley area of Shelby County, is drilling below 8,905 ft. in sand.

Humble 1 Ayres, southeast outpost to 1 Bruce, recent discovery in the J. Salinga Survey, Van Zandt County, is dry at 8,827 ft. Phillips Petroleum Co. 1 Hairston-Johnson, north offset to the discovery in the South Tyler pool of southern Smith County, is drilling below 9,118 ft. in lime and shale. Lone Star Producing Co. will drill the first 10,000-ft. test in the Opelika area of northeastern Henderson County. It is 1 Jane Saylors in the Adrian Anglin Survey.

T. G. Shaw Oil Co. 1 J. L. Bailey, W. H. Walters Survey in the Lone Star pool, Cherokee County, flowed 18 bbl. of oil per hour through perforations from 3,948-52 ft. in the Woodbine. Total depth is 4,057 ft. Roeser & Pendleton, Inc. 1 Ware & Bailey, Ritter Survey in the Long Lake pool, Anderson County, after being treated with 5,000 gal. of acid, tested 96 bbl. of oil in 14 hours through perforations from 7,544-63 ft. in the Rodessa. It is being retreated with 10,000 gal. Magnolia Petroleum Corp. 2-A Herring, Samuel Burch Survey in the Manziel pool, Wood County, gaged 180 bbl. of oil in 22 hours at 8,300 ft. This is the largest producer from the Rodessa in the pool, the average production being 40 to 50 bbl. in 24 hours.

EASTERN TEXAS SUCCESSFUL WILDCAT

Wood County: New oil pay—Amerada 3 Faulk, James Knight Sur., Coke pool, elev. 501 ft., top pay 8,080 ft., IP 170 bbl. 70° condensate and 3,200,000 cu. ft. gas, perf. 8,080-8,130 ft. Young, TD 8,375 ft.

EASTERN TEXAS WILDCAT FAILURES

Houston County: James Papadakis 1 Houston Co. Coal Co., E. W. Goolsby Sur., 4 mi. NW Lovelady, elev. 311 ft., dry, TD 3,400 ft.

Hunt County: Ohio 1 Valerie Popper, O. M. Roberts Sur. No. 23, 2 mi. SE Cash, Travis Peak 5,860 ft., Cotton Valley 7,043 ft., Smackover 9,181 ft., dry, TD 9,390 ft.

Kaufman County: Ryan Consolidated Petroleum 1 Mrs. W. Dorsey Brown, Matilda Reynolds Sur., 7 mi. S Kaufman, elev. 419 ft., Woodbine 2,510 ft., dry, TD 3,065 ft.

ILLINOIS

West Divide Pool Yields Best Producer of the Week

CENTRALIA. — Gulf Refining Co. 2 Green, NE NW NE 23-1s-3e, in the West Divide field in Jefferson County, pumped and flowed 993 bbl. per day from acidized McClosky lime at 2,740 to 2,804 ft., at intervals. Gulf's 1 Green, completed early in April, flowed 1,123 bbl. per day in its early stages.

Robinson & Puckett extended the Clay City field in Wayne County with 1 Molt, NE NW NW 33-1n-8e, completed in Aux Vases sand at 3,023-34 ft. and shot. It produced 123 bbl. initially.

A pool was opened in Marion County by T. R. Buel and Doran 1 Young, SE NE SE 12-2n-1e, a 125-bbl. well in Cypress sand at 1,746-60 ft.

SUCCESSFUL ILLINOIS WILDCAT COMPLETIONS

Marion County: T. R. Buel & Doran 1 Young, SE NE SE 12-2n-1e, Cypress sand 1,746-60 ft. TD, pumped 125 bbl. in 24 hours. Pool opener.

Wayne County: Robinson & Puckett 1 Molt, NE NW NW 33-1n-8e, Aux Vases sand 3,023-34 ft., shot, TD 3,226 ft., pumped 123 bbl. in 24 hours. Extends Clay City Consolidated pool.

ILLINOIS WILDCAT FAILURES

Clark County: W. H. Wright 1 W. Doran, NW NW NW 29-9n-13w, dry at 1,325 ft., Ste. Genevieve lime at 874 ft.

Edwards County: J. E. Houseman 1 Luth-

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DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

er, SW NW NW 18-1n-14w, dry at 3,257 ft. Menard 2,321 ft., Benoist 3,023 ft., McClosky 3,238 ft.

Gallatin County: Ashland 1 R. H. Davis, SE NW SE 1-8s-8e, dry at 3,013 ft. Menard 2,006 ft., Benoist 2,635 ft., Aux Vases 2,808 ft., McClosky 2,945 ft.

Hamilton County: National Associated 1 E. S. Hall, SE SW NE 9-5s-7e, dry at 3,420 ft. Lower Kincaid 2,246 ft., Barlow 3,081 ft., Cypress 3,124 ft., Benoist 3,301 ft., Aux Vases 3,412 ft.

Washington County: Harry Hubbard 1 Doalin, SE SE SE 25-3s-5w, dry at 2,412 ft., Glen Dean 721 ft., Barlow 906 ft., Benoist 1,057 ft., Aux Vases 1,100 ft., Ste. Genevieve 1,153 ft., Osage 1,851 ft., Louisiana 2,313 ft., Chattanooga 2,320 ft., Devonian 2,340 ft.

White County: Herndon Drilling 1 D. E. Brown, SE SE NW 11-5s-10e, dry at 3,160 ft., Degonia 2,033 ft., Tar Springs 2,371 ft., Cypress 2,671 ft., Benoist 2,877 ft., Aux Vases 2,978 ft., Ste. Genevieve 3,000 ft.

PERMIAN BASIN

Testing Will Continue on San Andres Discovery

MIDLAND.—Stanolind Oil & Gas Co. 1 J. F. Edwards, Section 13, Block L, PSL Survey, San Andres discovery in southwestern Cochran County, 11½ miles west of the Rhodes pool, plugged back to 5,090 ft. from total depth of 5,111 ft. Seven-inch casing was cemented at 5,225 ft. Two-inch tubing was run to 5,090 ft. and 88 bbl. of oil and 12 bbl. of wash water were swabbed in 4 hours. After being shut in 12 hours, it swabbed 76 bbl. of oil and 21 bbl. of acid water. Testing and swabbing will continue. Stanolind 1 E. L. Slaughter, wildcat 1½ miles south of Morton in northeastern Cochran, swabbed 10 bbl. of water per hour while testing at total depth of 10,430 ft., with no shows reported.

Gaines County.—Humble Oil & Refining Co. 1 O. L. Bishop, wildcat 5 miles southwest of the Cedar Lake pool, is a failure at 5,187 ft. in the San Andres after a 90-minute drill-stem test from 5,073-5,187 ft. recovered 1,350 ft. of sulfur water and drilling mud. There were no shows of oil or gas. Another failure is Honolulu Oil Corp. 1-98 D. E. Cunningham, wildcat in the Homann gas district, 6 miles northeast of Seminole. Total depth is 5,478 ft. Amerada Petroleum Corp. 1-A Jones, prospective discovery 7 miles northwest of the Russell pool, is drilling below 9,575 ft. in lime. Shell Oil Co., Inc. 1 Cox, northeast outpost to the Russell pool, is drilling below 6,020 ft. in lime.

Winkler County.—Gulf Oil Corp. 65-E Keystone, rated 500,000 cu. ft. of gas and recovered 300 ft. of gas-cut mud and 60 ft. of oil-cut mud on a 1-hour drill-stem test from 5,260-5,311 ft. This is in the Tubb zone, the indicated seventh producing zone in the Keystone field. The eighth pay is the Waddell, opened by Gulf 60-E Keystone. On a drill-stem test from 8,745-8,811 ft. in this zone, recovery was 155 ft. of 58.4°-gravity distillate with maximum gas volume of 6,163,000 cu. ft. of gas. The test will be deepened to the Ellenburger. Richardson & Bass 1 KCS, wildcat 2¾ miles south of the Keystone-Ellenburger pool, topped the Ellenburger at 10,570 ft. Operator is preparing to run casing at 10,637 ft., total depth. Richardson & Bass 1 Sanford, wildcat 2¾ miles southeast of the pool, ran a drill-stem test from 8,459-8,591 ft. and recovered 270 ft. of gas-cut mud. It was drilling below 8,618 ft. in lime.

Andrews County.—Magnolia Petroleum Corp. 1 Joseph Martin, wildcat 2 miles south of Devonian production in the Fullerton pool, acidized with 2,000 gal. at plugged-back depth of 4,668 ft. and swabbed 5 bbl. of oil per hour, showing 1,000 ft. of fluid in the hole. Total depth is 10,118 ft. Magnolia and Humble 1 Cowden, wildcat in the southwest corner of the county, topped the San Andres at 4,110 ft. It was drilling below 4,474 ft. in lime. DeKalb Agricultural Association, Inc., 1 Lockhart & Brown, 1-mile northwest outpost to the Fuhrman-Mascho pool, pumped 125 bbl. of oil in 24 hours. Total depth is 4,595 ft.

WEST TEXAS SUCCESSFUL WILDCAT

Ector County: Extension to old oil pool—Shell 1-A Thomas, Sec. 8, Blk. 45, T-1-S, T&P Sur., TXL pool, flowed 1,547 bbl. day through ½-in. choke on 2-in. tubing, perf. 9,705-9,852 ft. Ellenburger, top pay 9,695 ft., gravity 44°, gas-oil ratio 1,192 to 1, TD 9,852 ft.

WEST TEXAS WILDCAT FAILURES

Ector County: Texas 1-B Fraser, Sec. 31, Blk. 45, T-1-S, T&P Sur., 4 mi. S TXL pool, elev. 3,147 ft., Glorietta 5,160 ft., Tubb 6,150 ft., Devonian 8,095 ft., Silurian 8,725 ft., dry, TD 9,339 ft.

Martin County: Mabee Oil & Gas 1 J. E. Mabee, Sec. 8, Blk. 38, T-1-N, G&MMB&A Sur., 6½ mi. SE Mabee pool, elev. 2,824 ft., Yates 2,990 ft., dry, TD 5,000 ft.

Terry County: Woodley Pet. 1 Whitt-Gunn, Sec. 7, Blk. C-39, 3½ mi. NE Crump, elev. 3,154 ft., San Andres 4,470 ft., dry, TD 5,250 ft.

Ward County: Gulf 1-E J. Edwards et al, Sec. 1, Blk. B-19, PSL Sur., 3½ mi. S Monahans pool, elev. 2,662 ft., Ellenburger 10,532 ft., dry, TD 10,862 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—McElvain Bros. 1 Seale, wildcat 5½ miles southwest of the Vacuum pool in Lea County, showed 2,500 ft. of oil when it cleaned out after shooting with nitroglycerin from 4,674-4,804 ft. It had recovered 10 bbl. of oil daily from

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4,675-86 ft. Neville Penrose, Inc. 3 Hinton on the east side of the Penrose field, recovered 565 ft. of gas-cut mud with 1,140,000 cu. ft. of gas on a 1-hour drill-stem test from 5,443-5,500 ft. It is drilling below 5,732 ft. in lime.

Stanolind Oil & Gas Co. 1 W. H. Jones, wildcat 7 miles southeast of Hobbs, on a 1-hour drill-stem test from 8,283-8,369 ft. recovered 270 ft. of drilling mud and 1,290 ft. of sulfur water. It is drilling below 9,780 ft. in lime unchanged. The Silurian was topped at 9,130 ft. Phillips Petroleum Corp. 4 Lea-Mex, wildcat northeast of the Maljamar field, is standing idle at 12,414 ft. in unreported formation.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURE

Lea County: Drilling & Exploration Co. 1 Gorman-Federal, 25-20s-34e, 2 mi. E Lynch pool, elev. 3,706 ft., dry, TD 3,825 ft.

MISSISSIPPI

Mallalieu May Be Defined On Southeast Flank

JACKSON.—A southeast outpost test at Mallalieu, The California Co. 1 Busby, NW NE SW 14-6n-8e, elevation 457 ft., now drilling at 10,560 ft., is reported checking low, and to have missed the "Douglas" pay. Humble Oil & Refining Co. 1 Smith, 12-9n-1e, prospective pool opener in Jefferson County, is reported to have had a poor sand section below 9,720 ft., with possibility of the sand zone carrying water below this depth. Gulf Refining Co. 1 Lees, 32-7n-1e, which may extend the Cranfield pool into Franklin County, is drilling at 9,558 ft., and electric log will be run to check the assumption that it is at the base of the Austin chalk. Superior Oil Co. 1 Thompson, NW NW SW 31-9n-18w, on the east flank of the Gwinville pool, is completing as a gas condensate producer at 8,145-80 ft.

ALABAMA WILDCAT FAILURES

Bullock County: Capital Oil & Gas 1 Gholston et al, SE SE 18-14n-22e, dry, TD 1,725 ft., granite wash 1,700 ft.

FLORIDA WILDCAT FAILURES

Bay County: Magnolia 1 State Block 4-B, SW SW 21-3s-15w, dry, TD 7,003 ft., Eutaw 4,257 ft.

Madison County: Hunt Oil 4 J. W. Gibson, NE NE 5-2s-11e, dry, TD 4,069 ft.

LA.-ARK.

Production in Jackson Parish With Gas Discovery

SHREVEPORT.—Jackson Parish entered the production list this week when Shell Oil Co., Inc. 1 Tremont, NW SE 22-15n-1w, was completed as an 8,000,000 cu. ft. gas well from pay at 9,584-9,620 ft.

Operators in this area wound up one of the busiest weeks in a long time with 17 oil wells, 4 gas wells and 3 dry holes completed in North Louisiana and Arkansas. Delhi led the list with 3 producers, good for a combined initial production of 550 bbl., and the Lisbon field had 2 gas wells with combined initial open flow of 61,000,000 cu. ft. The best wells in Arkansas were 2 for a total of 325 bbl. in the Fouke field, and one 336-bbl. Smackover well in the McKamie field.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Jackson Parish: Shell Oil Co., Inc., 1 Tremont Oil, NW SE 22-15n-1w, 8,000,000 cu. ft. gas, pay zone 9,584-9,620 ft., TD 10,300.

NORTH LOUISIANA WILDCAT FAILURES

Rapides Parish: Louisiana Land & Exploration A-4 Bentley No. 2, NW NW 36-5n-5w, dry, TD 7,200 ft.

OKLAHOMA

Antioch and Ramsey Areas Continue in Spotlight

THE Cities Service Oil Co. opened its second new pool of the year in Oklahoma with 1 Abernathy, SE SW SE 13-3n-2w, near Antioch, Garvin County, and has asked the Corporation Commission of Oklahoma for a 150-bbl. per day per well allocation temporarily. The well found production in the Bromide sand at 5,495-5,502 ft. Pipe was set at 5,494 ft., and when plug was drilled it flowed 70 bbl. of fluid the first hour cutting 15 to 18 per cent wash water and mud, then 60 bbl. per hour cutting 10 to 15 per cent. There was no salt water. The well flowed 410 bbl. of fluid and then quit. Later when the hole was washed out with oil it flowed 186 bbl. in 6 hours through 1-in. choke on tubing, but cutting 4 per cent. It was then shut in awaiting tankage.

Cities Service Oil Co. et al 1 Lawson, C SW NW 22-5n-4w, north of Lindsay in McClain County, a "mystery" wildcat, was drilling at an estimated depth of 10,211 ft., with Viola lime topped at 10,159 ft. (also a guess). This hole is contracted to go to 12,000 ft., if necessary. Partners

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are Mid-Continent and Phillips companies.

Mid-Continent Petroleum Corp. et al 3 Columbia, NW NE SW 18-18n-2e, Payne County, an old first Wilcox sand producer in the Ramsey pool, deepened to second Wilcox sand at 4,746-4,824 ft., was flowing 30 bbl. of oil per hour on Saturday, a considerable increase over its early showing of 390 bbl. in 18 hours.

OKLAHOMA WILDCAT FAILURES

Canadian County: Sinclair Prairie 1 Rott, NW SE SE 1-14n-9w, dry, TD 7,500 ft., elev. 1,250 ft., Pawhuska 4,360 ft., Oread 5,020 ft., Hogshooter 6,280 ft., Layton 6,438 ft., Cleveland 6,940 ft.

Carter County: Pure 1 Genn, NW NW NW 7-3s-2e, dry, TD 8,586 ft., elev. 908 ft., Woodford 5,852 ft., Hunton 6,160 ft., Sylvan 6,358 ft., Viola 6,645 ft., first Bromide 7,965 ft., McLish sand 8,501 ft.

Cleveland County: Magnolia 1 Lexington "A", NE NE SW 20-6n-1w, dry, TD 7,050 ft., elev. 1,026 ft., Woodford 6,690 ft., Hunton 6,804 ft.

Cotton County: Miller & McCormick 1 Russell, SE SE NE 35-4s-12w, dry, TD 1,703 ft.

Garfield County: E. S. Adkins and Sohio 1 School Land, NW NE NW 36-21n-4w, dry, TD 4,704 ft., Layton 4,622-96 ft.

Garvin County: M. S. Inglewright 1 Carter, SE SE NE 28-3n-2e, dry, TD 3,203 ft., elev. 1,029 ft., first Bromide 2,700 ft., second Bromide 2,763 ft., Basal Bromide 2,827 ft., McLish 3,010 ft., McLish sand 3,170 ft.

Grant County: A. Gutowski 1 Shipley, NW NW SE 33-27n-3w, dry, TD 5,090 ft., elev. 1,073 ft., Woodford 4,970 ft., Viola 5,012 ft., Simpson 5,025 ft., second Wilcox 5,045 ft.

Hughes County: Deep Rock 1 Henley, SE NW NE 1-5n-9e, dry, TD 4,441 ft., elev. 826 ft., Booch 2,590 ft., Hartsh. Coal 2,801 ft., Gilcrease 3,390 ft.

Kay County: A. Leeper 1 Dunlap, NE NE NW 18-26n-2e, dry, TD 2,500 ft., Hoover 1,750 ft., Tonkawa 2,300 ft.

Logan County: Mid-Continent 1 Shaffer, SW SW NE 1-17n-4w, dry, TD 5,010 ft., elev. 1,082 ft., Layton 4,870 ft.

Oklahoma County: J. E. Trigg 1 Morgan, SE NW NW 5-14n-3w, dry, TD 6,744 ft., elev. 1,096 ft., Oswego 5,885 ft., Bartlesville 6,127 ft., Woodford 6,159 ft., Sylvan 6,360 ft., Viola 6,463 ft., Wilcox 6,636 ft., second Wilcox 6,720 ft.

Pontotoc County: Rhinehart 1 Larsh, NE NW SW 17-2n-5e, dry, TD 937 ft., elev. 1,174 ft.

Seminole County: J. Droppleman 1 Chesser, SE SE NW 18-10n-7e, dry, TD 3,822 ft., elev. 995 ft., Booch 3,513 ft., Gilcrease 3,574 ft., Cromwell 3,803 ft.

MICHIGAN

Michigan Production Still Nearly Equals Demand

SAGINAW.—Michigan continues to produce close to the demand for its crude oil despite lack of any recent major discoveries, according to F. R. Frye, state petroleum engineer. Production this year is showing a slight monthly gain, he said. June daily average may run to 47,830 bbl. It was 47,630 for May, 47,500 for April.

Frye said drilling operations are running 10 per cent ahead of last year, although wildcatting shows a decline. Holding up production is the growing Coldwater field in Isabella County and the spasmodic gushers in Arenac County's Deep River pool.

The state oil advisory board, incidentally, is arranging a statewide hearing at Lansing June 25 on current proration schedules which have not been reviewed since January.

MICHIGAN WILDCAT COMPLETIONS

Allegan County, Otsego Township: W. Spencer Cook 1 Gladys McKee, SW SW NW 3-1n-12w, dry in Traverse limestone, TD 1,494 ft.

Lake County, Peacock Township: John P. O'Neill 1 E. J. Hurley, W½ NW NW 11-19n-13w, dry in Detroit River, TD 3,086 ft.

Mecosta County, Wheatland Township: Smith Petroleum Co. 1 Herman C. Ortwein, SE NW NE 7-14n-7w, acidized for 51 bbl. and salt water first 24 hours, 75 bbl. and salt water second 24 hours, TD 3,690 ft.

Montcalm County, Bloomer Township: Perry, Gould & Cross 1 Sessions et al, E½ SE NW 17-9n-5w, dry in Dundee, TD 3,184 ft.

Evergreen Township: Allegan Pipe & Supply Co. 1 Cora Keeler, SE NW NE 2-10n-6w, gas well, 65,000 cu. ft., TD 1,158 ft.

KANSAS

Sedgwick County Gets New Pool West of Wichita

FULTON & TURNER 1 Hohn, NW NW SW 23-27-1w, 2 miles west of the Wichita city limits, is good for 100 bbl. from the Kansas City lime at 2,817-27 ft., opening a new pool, and completing a circle of production on all sides of Wichita. Carter Oil Co. 1 Latimer, NW NE 12-33-2w, Sumner County Simpson strike, on testing, swabbed 6 bbl. per hour for 48 hours. pay zone 4,268-82 ft.

KANSAS SUCCESSFUL WILDCATS

Barton County: R. W. Gear et al 1 Carroll, SW NE SE 21-17-14w, pumped 150 bbl. oil after acidizing with 3,000 gal.,

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LEGAL

CALL FOR BIDS. To purchase royalty crude oil accruing to the United States from the Cat Creek oil field, Montana. Pursuant to the provisions of section 36 of the Act approved February 25, 1920 (41 Stat. 451, 30 U. S. C. 192), sealed proposals, in duplicate, will be received in the Office of the Secretary of the Interior, Washington, D. C., on or before noon on June 11, 1945, from responsible bidders for the sale and purchase under contract of all royalty crude oil accruing to the United States from Federal lands in the Cat Creek oil field, Montana, commencing July 1, 1945, and extending from said date during and throughout the period of the National Emergency as declared by the President, but not to exceed a term of 2 years in any event and subject to termination by either the Government, as seller, or the successful bidder or bidders, as purchaser, upon 60 days' notice in writing if the National Emergency is declared terminated by Proclamation of the President or by Act of Congress prior to the expiration of the aforesaid 2-year period. The monthly royalty during the year 1944 averaged about 850 barrels of "light oil," or a total for the year amounting to about 10,200 barrels. The gravity of the Government's Cat Creek royalty crude oil approximates 50° A.P.I. Additional information concerning the specifications governing the sale of the Government's royalty crude oil from the Cat Creek field may be obtained from the Director, Geological Survey, U. S. Department of the Interior, Washington, 25, D. C., or the Oil and Gas Supervisor, U. S. Geological Survey, Federal Building, Casper, Wyoming. Sealed bids are to be submitted to the Secretary, Department of the Interior, Washington, 25, D. C., pursuant to the specifications, the envelope to be marked plainly, "Bid on Cat Creek royalty crude oil—not to be opened before noon, June 11, 1945." No bid received after the time fixed herein for submitting bids will be considered. Oscar L. Chapman, Assistant Secretary of the Interior.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that the lands herein described within the known geologic structure of the Byron oil and gas field, Wyoming, are offered to the responsible qualified bidders of the highest cash bonus per acre for lease under section 17 of the mineral leasing act, as amended by the Act of August 21, 1935 (49 Stat. 674, 30 U. S. C. sec. 226), in the following parcels: Parcel No. 1, T. 56 N., R. 97 W., sec. 14, lot 45-A, 40.14 acres; Parcel No. 2, T. 56 N., R. 97 W., sec. 22, lot 9, 28.21 acres; Parcel No. 3, T. 56 N., R. 97 W., sec. 22, lot 47-D, 41.69 acres; Parcel No. 4, T. 56 N., R. 96 W., sec. 30, lot 3, 37.49 acres; Parcel No. 5, T. 56 N., R. 97 W., sec. 36, lots 1 and 116, 88.33 acres. Total acreage, 235.86 acres. Sealed bids will be received in the office of the Commissioner of the General Land Office, Interior Building, Washington 25, D. C., up to twelve noon June 19, 1945. Bids must be submitted on each parcel separately, but if two or more parcels are awarded to the same bidder they may be combined in a single lease. Each bidder must submit a certified check or cash for one-fifth of the amount bid payable to the order of the Treasurer of the United States and file the showing of qualifications to receive a lease required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental at the rate of $1 per acre must be paid, and a $5,000 corporate surety bond must be furnished by the successful bidder prior to the issuance of the lease. The deposits of the other bidders will be returned upon acceptance of the successful bid by the Secretary of the Interior. The envelopes should be plainly marked "Bid for Parcel No.—, Byron oil and gas field. Not to be opened before noon June 19, 1945." No bids received after the hour fixed herein for submitting bids will be considered. The successful bidders will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color, or national origin and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

Arbuckle pay zone 3,356-70 ft., TD 3,370 ft., elev. 1,886 ft., Base Kansas City 3,330 ft., Arbuckle 3,356 ft.

Coffey County: Champlin & Koch 1 Christianson, NE SW NE 29-20-14e, 6,000,000 cu. ft. gas with spray oil and water, from Arbuckle pay zone 3,601-11 ft., after perforating with 36 shots, TD 3,642 ft., Simpson 3,590 ft., Arbuckle 3,598 ft.

KANSAS WILDCAT FAILURES

Jackson County: D. McLaughlin Development Co. 1 Allan, SW NW NE 32-8-16e, dry, TD 3,068 ft., elev. 1,134 ft., Viola 2,730 ft., Simpson 2,915 ft., Simpson sand 2,942 ft., Arbuckle 3,025 ft.

Marion County: W. McGinnis 1 Propp, N/2 NW NE 25-19-3e, temp. aband., TD 2,829 ft., elev. 1,377 ft., Mississippi lime 2,377 ft., Viola 2,665 ft., Simpson 2,740 ft., Arbuckle 2,810 ft.

Pawnee County: Inland Oil 1 English, SW NW SW 1-21-15w, TD 3,714 ft., elev. 1,946 ft., Basal Kansas City 3,320 ft., conglomerate 3,611 ft., granite 3,709 ft.

Rush County: Vickers et al 1 Suhckman, NW NW NW 20-16-18w, dry, TD 3,619 ft., elev. 2,019 ft., Kansas City 3,307 ft., cherty conglomerate 3,582 ft., basal sand 3,596 ft., quartzite 3,614 ft.

Saline County: J. Kornfeld et al 1 Lindell, NE NE SE 34-16-3w, dry, TD 3,450 ft., elev. 1,315 ft., Kansas City 2,217 ft., Mississippi lime 2,927 ft., Viola 3,441 ft.

Sedgwick County: Beech Aircraft 1 Gehring, NE NW SW 16-28-2e, dry, TD 3,395 ft., elev. 1,347 ft., Arbuckle 3,386 ft.

Seward County: Carter 1 Chapple, cente. 23-31-32w, dry, TD 2,890 ft., elev. 2,846 ft., Cedar Hill sandstone 1,240 ft., Hollenberg 2,572 ft., Herrington top 2,603 ft., Herrington lower 2,640 ft., Krider 2,656 ft., Fort Riley 2,765 ft., Florence flint 2,855 ft.

ROCKY MOUNTAIN

SE Colorado Wildcat Running Pipe to Test

DENVER.—Union Oil Co. of California and Richfield Oil Co. 1 Kroell, SE NW NW 27-21s-46w, a wildcat on the East May Valley structure, Prowers County, southeastern Colorado, is reported to have a show of oil and gas in the Kansas City lime of sufficient importance to justify running pipe and making a test.

The first gas was reported at 3,818 ft., the quantity being small, but increasing gradually down to 3,833 ft., when oil saturation showed up in the cores. The hole was drilled to 3,950 ft., where it is preparing to run a string of 9⅝-in. casing. The quantity and quality of oil showing between 3,833 ft. and the bottom of the hole is not disclosed, but the fact that casing is to be run is considered significant. The well is located 10 miles north of Trojan Oil & Gas Co. 1 Lotus, drilled in 1935, which had good shows in the Kansas City lime at 3,954-61 ft., and in the Fort Scott lime at 4,019-33 ft., the former being green oil of 37° gravity.

Deepest Colorado well to go deeper.—Superior Oil Co. is building road and moving in equipment to deepen 1 Miller, SW SW NW 36-8s-91w, on Divide Creek, Mesa County, Colorado, which in 1939 established a depth record for the Rocky Mountain area by drilling to 10,815 ft. The well was drilled to this depth by Continental Oil Co. in a joint operation with the California Co. and Amerada Petroleum Corp. It stopped in the Mancos shale but the hole was left in condition to go deeper. Superior has acquired the other interests and plans to carry the well to the Dakota and possibly the Sundance.

Weber sand test at West Douglas Creek.—General Petroleum Corp. is grading road to location for 1 Government, C NE SW 24-2s-103w, an important wildcat on West Douglas Creek, 18 miles south of the Rangely field, Rio Blanco County, Colorado. The test is spotted 7 miles to the northwest of 1 Government, NW NW SW 5-3s-101w, on the Douglas Creek structure, which was drilled in 1942 by Superior Oil Co. in a joint operation with Continental Oil Co. and Union Oil Co. of California.

Midway test to plug back.—Kerlyn Oil Co.-Phillips Petroleum Co. 1 Government, NE SE NE 23-35n-79w, Midway dome, Natrona County, Wyoming, drilled to 8,430 ft., testing the Tensleep and Madison without favorable results, and is preparing to plug back and test the Dakota at 5,940-80 ft., and upper horizons of the Wall Creek at 5,140-85 ft., both of which showed saturation on the way down. The field has some production in the second Wall Creek, but this was the first test to be drilled below the Dakota.

OHIO, KENTUCKY

Berea Sand Pool Extended ¼ Mile East

COLUMBUS.—Preston Oil Co. 2 Glennis Taylor, Section 3, Bedford Township, Meigs County, extends the Berea sand oil pool ¼ mile east and is probably the best well yet completed. Sand at 1,774-1,785 ft. was shot and flowed 85 bbl. The proven area of the pool is now 2 miles north and south and ½ mile east and west.

The Ohio Oil Co. is drilling in its 1 Richard Denning, Section 12, Knox Township, Columbiana County, with 3,225,000 cu. ft. at 7 ft. in the Oriskany sand. The well, 1 mile northeast of the discovery, is one of 14 wells now located and drilling in the area. Top of the sand was found at 3,577 ft.

WILDCAT FAILURE COMPLETED IN OHIO

Muskingum County, Muskingum Township: L. C. Moore et al 1 Perry Mc-

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that lot 16, sec. 23, T. 4 N., R. 92 W., 6th P.M., Colorado, 8.28 acres in the Iles oil field, is offered to the responsible qualified bidder of the highest cash bonus per acre for lease under sec. 17 of the mineral leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U. S. C. 226). Sealed bids will be received in the office of the Commissioner of the General Land Office, Interior Building, Washington 25, D. C., up to 12 noon, June 20, 1945. Each bidder must submit a certified check or cash for one-fifth of the amount bid, payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required by section 7 of Circular No. 1386. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished by the successful bidder prior to the issuance of the lease. The deposits of the other bidders will be returned upon acceptance of the successful bid by the Secretary of the Interior. The envelopes should be plainly marked "Bid for lease in Iles oil field, Colorado. Not to be opened before noon, June 20, 1945." No bid received after the time fixed herein for submitting bids will be considered. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color or national origin and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended June 2, 1945					Cumulative total, 1945				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	0	1	1	0	0	7	28	35
Indiana	0	0	0	2	2	2	0	0	8	10
Illinois	2	0	0	6	8	19	0	0	105	124
Kentucky	3	0	0	2	5	10	0	1	16	27
Michigan	1	0	1	3	5	4	0	2	103	109
Kansas	1	0	1	7	9	18	0	9	136	163
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	9	9
Oklahoma	0	0	0	13	13	43	0	6	138	187
Texas:										
North Central	1	0	0	8	9	38	0	4	194	236
West	1	0	0	4	5	26	0	0	122	148
Panhandle	0	0	0	0	0	0	0	1	4	5
Eastern	0	1	0	3	4	5	3	0	37	45
Gulf Coast	0	0	1	9	10	26	2	14	112	154
Southwest	0	0	0	6	6	9	1	3	74	87
Total Texas	2	1	1	30	34	104	6	22	543	675
Louisiana:										
Northern	0	0	1	1	2	1	1	3	28	33
Southern	0	1	0	1	2	13	1	0	20	34
Total Louisiana	0	1	1	2	4	14	2	3	48	67
Arkansas	0	0	0	0	0	0	0	0	22	22
Mississippi	0	0	0	0	0	3	0	0	46	49
Ala., Ga., Florida	0	0	0	3	3	0	0	1	13	14
Montana	0	0	0	0	0	6	0	0	9	15
Wyoming	0	0	0	0	0	8	0	0	17	25
Colorado-Utah	0	0	0	0	0	0	0	0	3	3
New Mexico	0	0	0	1	1	6	0	2	26	34
California	0	0	0	3	3	1	0	2	83	86
Total United States	9	2	4	73	88	838	8	55	1,353	1,054
Total previous week	9	1	0	61	71					

Elfresh, Sec. 4, Clinton 3,331-3,381 ft., dry, TD 3,434 ft.

EASTERN KENTUCKY

ASHLAND.—Operations during the week were confined to three oil completions, with a total initial production of 44 bbl. The Virginia Gasoline & Oil Co. completed No. 1 on the Freelin Preece farm in Martin County for 35 bbl. at 1,321 ft. The same company completed No. 5 on the W. J. Sparks farm on Big Crooked Creek in Martin County, at a depth of 1,390 ft. for 6 bbl. Kentucky Oil Producers completed No. 4 on the John Rose farm, Keaton Creek in Johnson County, for 3 bbl. at a depth of 850 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Three wildcats in Henderson County, western Kentucky, were completed as substantial oil producers during the week in review, while two other wildcats, one in McLean and one in Webster County, were dry.

WESTERN KENTUCKY SUCCESSFUL WILDCAT COMPLETIONS

Henderson County: Salee Bros. and J. W. Carter, SE 21-O-22, 1 J. W. Liles, SE 21-O-22, 1 mile S of Dixie, Cypress sand 2,289-2,301 ft., TD 2,301 ft., IP 185 bbl. of oil and 84 bbl. of water, sand not shot. Opens Dixie pool.

Sun Oil 1 Pritchett, SE 21-O-22, Cypress sand 2,294-2,304½ ft., still in sand, IP 114 bbl. of oil, no water, sand not shot. Extends Dixie pool.

National Associated 1 H. E. Denton, NW NE NE 7-O-23, Cypress sand 2,250-55 ft., TD, IP 88 bbl. in 12 hours. Earlier had made 42 bbl. in 8 hours. Pool opener.

WESTERN KENTUCKY WILDCAT FAILURES

Webster County: Browning and Ashland 1 E. Knight, C N½ NW 10-M-25, 3 mi. S of Sebree, dry at 2,837 ft., lower Menard 1,970 ft., Glen Dean 2,169 ft., Barlow 2,389 ft., Ste. Genevieve 2,630 ft.

McLean County: Miller & Shiarella and Ashland 1 L. G. Leachman, 18-N-27, 2 mi. W of Guffey, dry at 2,260 ft., Barlow 1,917 ft., Ste. Genevieve 2,094 ft., McClosky 2,188 ft.

INDIANA

EVANSVILLE, Ind.—Three dry holes and an 80-bbl. producer comprised the week's crop of completed wells in Indiana reported during the week.

WILDCAT FAILURES IN INDIANA

Gibson County: Bennett Bros. 1 W. A. Owen, NE SW SW 29-3s-12w, dry at 2,795 ft., McClosky lime 2,787-89 ft.

Spencer County: Maier Productions 1 Douthett-McKinney, NW NW SE 30-7s-7w, dry at 1,755 ft., no log.

CANADIAN FIELDS

Test on Turner Valley Extension Shows 720 Bbl.

CHATHAM.—Testing for a southerly extension of Turner Valley, Imperial-Federated 1, LSD 16, 5-18-2w5, finished with Madison at 8,227-8,447 ft. Early drill test of the upper porous indicated 720 bbl. a day before acidizing, with 70,000 cu. ft. of gas. Location is ¼ mile east and slightly south of Brown Oil 6, previously the most southerly producer.

In North Turner Valley, Royalite-Lowery 2, LSD 1, 15-20-3w5, with Madison at 8,102-8,550 ft. produced around 575 bbl. a day after acidizing with 2,500 gal.

Calling Valley.—On the Calling Valley structure, east of North Turner Valley Extension, Calling Valley Syndicate 1, LSD 6, 24-21-3w5, acidized the top of the Madison at 9,720-95 ft. without developing commercial production. After deepening, a second drill-stem test at 9,837 ft. showed no water and traces of oil.

Steveville.—In the Steveville-Princess field, eastern Alberta, Toronto Syndicate 1, LSD 1, 6-22-13w4, has been capped as a gasser at 4,379 ft. Test got a gas flow with potential between 7 and 8 million cubic feet in the basal Colorado but failed to get oil in quantity, and failed to get the Sunburst sand on deepening. No porosity was encountered in the Devonian.

Fort Norman.—Under federal Government regulations, Imperial Oil has taken up a new exploration permit covering a total of 2,000,000 acres in the Mackenzie Valley.

MARKET QUOTATIONS

Prices as of June 5, 1945

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gallon.)

REFINERY GASOLINE

Octane (A.S.T.M.)	76†	70-74
Mid-Continent*	6.75	5.875
Gulf Coast	6.75	5.825
Northeast Coast	...	9.075
California	...	6.50-7.00

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades:	25-70	10-55
Oklahoma (Group 3)	4.500	5.400
North Texas (f.o.b. plant)	4.125	4.950
North Louisiana (f.o.b. plant)	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per bbl.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois Basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas	1.03

Note: Exclusive of subsidy.

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma Kansas	Gulf Coast Texas	West Tex.*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT

Week ended May 26, 1945
(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Distillate	Residual
East Coast	732	13,603	5,923	5,575
Appalachian	169	3,865	440	334
Ill., Ind., Ky.	788	21,780	3,939	1,888
Okla., Kan., Mo.	393	9,287	1,690	1,146
Inland Texas	257	2,932	365	823
Tex. Gulf Coast	1,188	13,681	6,135	5,909
La. Gulf Coast	267	4,463	1,517	1,429
North La., Ark.	74	2,682	714	197
Rocky Mt.	123	2,456	296	627
California	959	14,390	8,165	20,620
Total 5-26-45	4,950	89,121*	29,184	38,548
Total 5-19-45	4,908	89,873	29,470	38,624
Total 5-27-44	4,561	86,263	32,074	50,617

*Military 40,856. Civilian 48,265.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
May 25, 1945	222,891,000
May 19, 1945	221,861,000
May 27, 1944	234,423,000

*Excludes unrefinable California stocks.

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"REFLEX"
WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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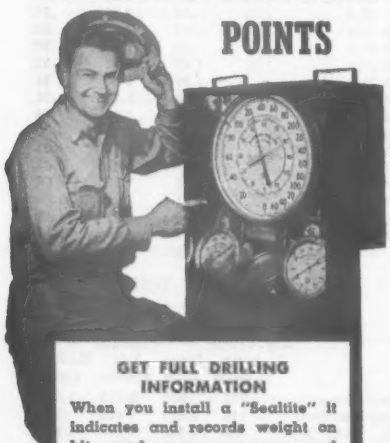


GET FULL DRILLING INFORMATION

When you install a "Sealtite" it indicates and records weight on bit, mud pump pressure, and torque in drill pipe. Rotary table speed is indicated and recorded so you know you're drilling a better well at less cost. This master drilling instrument really controls operations instantly, accurately *at all depths on any well.*

MARTIN-DECKER CORP.
LONG BEACH, CALIFORNIA
A. F. McQUISTON, BAKERSFIELD, CALIFORNIA
REED ROLLER BIT CO., HOUSTON, TEXAS

Among the Drilling Contractors

Stone Drilling Co. has been awarded contract to drill a new well for L. W. Frankley in the Midway-Sunset field of Kern County, California, work will start as soon as drilling equipment is available.

Keating Drilling Co., Tulsa, has completed wells for Pure Oil Co., Magnolia Petroleum Co., Ohio Oil Co., and Phillips Petroleum Co. in the Illinois area, and is moving to additional locations. The company has extended work for Gulf Oil Corp., Carter Oil Co., and Benedum-Trees Oil Co. in Union and Henderson counties, Kentucky.

R. L. Bauman Drilling Co., Dallas, Tex., has the contract to deepen the John I. and P. D. Moore 1 (Waddell) Southland Royalty Co., southwestern Crane County wildcat, from 3,024 to 8,000 ft.

Union Drilling Corp. has been awarded contract to drill the Michigan Consolidated Gas Co. 1 Dorus Church et ux, in C SW 1-16n-8w, Mecosta County, Michigan.

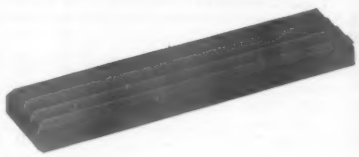
General Petroleums, Ltd., of Calgary, Alta., have moved in drilling outfit for Bata Petroleums 4, LSD 14, 24-39-23w3, in the Unity-Vera field in western Saskatchewan. This is the latest of a series of 10 wells for which General Petroleums have the contract. Bata 5 has been spotted in LSD 4, 25-39-23w3.

San Joaquin Drilling Co. has been awarded contract and has already started cleaning out to bottom 10,499 ft., on the Bacon Hills wildcat of Bandini Petroleum Co., in Kern County, California.

Chas. Mills, of Lloydminster, is drilling below 1,450 ft. on Saskatoon-Aberdeen 1, LSD 9, 6-39-2w3, a test for gas in the Aberdeen district 21 miles northeast of Saskatoon. Two additional wells are to be drilled if the first is productive.

Sam E. Wilson, Jr., Corpus Christi, Tex., owner and president of **SEW Oil Corp.,** a drilling company, has sold his producing oil and gas properties in Nueces, Jim Wells, Aransas, and San Patricio counties, Texas, to

WEB WILSON
Tong Dies



Don't be misled. WEB WILSON Dies are the original vertical tooth reversible dies. Scientifically heat treated for extra life.

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THE POSITIVE LEAK PREVENTER

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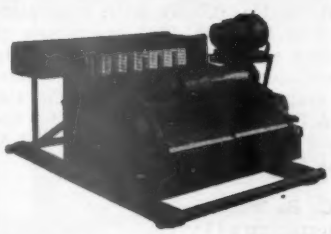

Handles the output from 20" mud pumps after surface hole is drilled. Average capacity 650 gallons per minute. Completely unitized. Screening surface—16 square feet. Domestic shipping weight less drive—1600 pounds. Headroom—27 inches. See Composite Catalog or write for details.

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McNEELY MATERIALS CO.
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Boyce & Smiser, of Houston, for a consideration of $3,600,000.

Valley Oil Operators, of Calgary, Alta., have started drilling Mercury-Mill City 1, LSD 10, 16-18-2w5, as a test of a new South Turner Valley east flank area. Heavy-duty rotary is being used with Madison limestone contact expected around 6,500 ft.

Thornbury - Casner & Bentz will drill a new well in the Dryden property in the Bardsdale area of Ventura County, California, for Union Oil Co. Location is in Section 12-3n-20w.

Martin Harris Drilling Co. has been awarded drilling contract on the J. H. Gwin 1 Allison Lumber Co., in C NE SW 36-19n-4w, Sumter County, Alabama.

Gulf Research & Development Co., of Pittsburgh, has started work with gravimeter parties south and west of Red Deer and west of the Blood Indian Reserve in southern Alberta.

Parker Drilling Co. is contractor on the Shell Oil Co., Inc., 1 H. H. Wheeles, in Section 5-14n-9e, Attala County, Mississippi.

H. M. McClure is the drilling contractor on the H. L. Wadsworth and H. M. McClure 1 Edith B. Griswold, in SE SW SE 31-9n-5w, Montcalm County, Michigan.

Cook Drilling Co. was building derrick to start its contract to drill the Love Petroleum Co.-Denkmann 2 Denkmann Dist., in C SW NW 22-7n-4e, Rankin County, Mississippi.

Atlantic Oil Co., independent oil producer in California, has taken several drilling contracts in the Wilmington field, in order to keep its equipment busy.

Newell & Chandler, of Calgary, Alta., have contract for Pacific Petroleums 9, LSD 11, 35-19-3w5, in West-Central Turner Valley and are rigging rotary from Pacific 8, recently completed as a good producer.

CALENDAR

June

Interstate Oil Compact Commission, executive committee meeting, Oklahoma City, June 15-16.

Canadian Gas Association, annual convention, Manoir Richelieu Hotel, Murray Bay, Quebec, June 19-22.

October

Texas Mid-Continent Oil and Gas Association, Rice Hotel, Houston, October 4-6.

I.P.A.A., annual membership meeting, Tulsa, October 15, 16 and 17.

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PERSONALS

Twenty Busy Years As Construction Engineer

WITH more than 20 busy years' experience as construction engineer in oil operations, G. L. Young, chief engineer for Signal Oil & Gas Co., has spent most of his life on the Pacific Coast. Born in Portland, Ore., Young graduated from Stanford University in 1921 with an A.B. in mechanical engineering. The next year he joined Signal Gasoline Co., which was completing its first absorption plant at Signal Hill and needed a gas tester and plant foreman. After helping to nurse Signal through its first 3 years of engineering problems Young went to work for Phillips Petroleum Co. in 1925 as construction superintendent for its Texas division.

In 1926 Young returned to Signal Oil & Gas Co. as superintendent of Mid-Continent operations and spent the next 4 years in construction and operation of the company's natural-gasoline plants in the Big Lake field, Texas. In 1930 he went back to California as chief engineer, and for the past 15 years he has directed the company's engineering activities, which run all the way from constructing oil-well foundations out in the Pacific Ocean to building terminals, warehouses, service stations, and other operational facilities. Recently elected to the board of directors of Signal Oil & Gas Co., Young is also a vice president and director of Signal Oil Co.

D. E. Johnson, superintendent of Creole Petroleum Corp.'s refinery at Caripito, Venezuela, will be in the United States during the rest of 1945, taking a refresher course and familiarizing himself with late developments in refinery technique.

Joseph Jensen, San Francisco, petroleum engineer, Tide Water Associated Oil Co., was chosen chairman of the conservation committee of California Oil Producers at the annual election. **H. S. Stark,** Honolulu Oil Corp., was elected first vice chairman; **John Hancock,** The Hancock Oil Co. of California, second vice chairman, and **Carlton Beal,** Richfield Oil Corp., secretary.

A. T. Hapke, Jr., has resigned as market research manager for Republic Aviation Corp. to head the newly created aviation section of the American Petroleum Industries Committee. Hapke, who graduated from Yale University in 1933, was a pilot for Pan American Airways, Inc., in 1936 and 1937, and flew all of the eastern division's routes through the Caribbean and South America.

Capt. George M. Black, a station engineer for Atlantic Pipe Line Co. in Dallas before he entered military service in 1941, is now petroleum-oils-lubricants officer in the engineer petroleum office of the Peninsular base section in Italy. His office supervised building of pipe lines up the Italian boot in support of the Fifth Army.

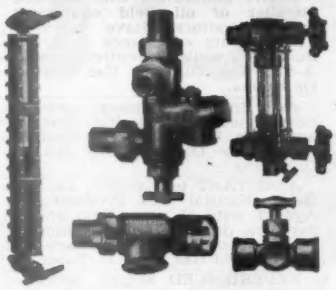
Maj. Edward C. Borrego, formerly field superintendent in eastern Venezuela for Standard Oil Co. of Venezuela (Creole Petroleum Corp.) last week ended 2 years' active military service in the Mediterranean theater for the U. S. Army, retiring to inactive status. He will return to Venezuela in about a month. He was superintendent in several eastern Venezuelan fields from 1939 to 1943 and previously worked in Mexico for Huasteca and in Illinois for The Carter Oil Co. In the Army, Major Borrego was assigned to the petroleum section, AFHQ, until April 18 when he was transferred to the Navy Petroleum Board in Washington. He saw service in Sicily, Corsica, North Africa and Italy.

Lloyd G. Ensign, formerly general manager of Lee C. Moore & Co., Inc., eastern division, Pittsburgh, recently resigned to become president of Oilfield-Industrial Export, Inc., a company organized to engage in sales and service for the foreign market. Ensign has been identified with the petroleum industry for the past 24 years, 15 of which were spent in charge of oil-producing operations in South America and the West Indies. The company has opened offices in the R.C.A. Building, New York.

George S. Buchanan, formerly president of Yegua Corp., has been named manager of the newly established Gulf Coast division of Sohio Petroleum Co., subsidiary of Standard Oil Co. (Ohio), with headquarters in Houston. The operations of Yegua and Sohio have been closely associated. Buchanan was previously employed by The Carter Oil Co. and Barnsdall Oil Co. Later he became vice president of Adams Oil & Gas Co., joining Yegua in 1939.

C. R. Wagner, internationally known authority on petroleum chemistry and refining technology, was awarded the degree of doctor of science last week at Wooster College, where he received his B.S. in 1915. Dr. Wagner joined Standard Oil Co. (Indiana) as a chemist in 1918, went to Lion Oil Refining Co. 5 years later and became manager of refining. He resigned that post in 1924 to become assistant chief chemist, later chief chemist, for Pure Oil Co. For 3

PENBERTHY
QUALITY PRODUCTS



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All are of rugged construction and made by an organization with 57 years experience in the manufacture of quality products.

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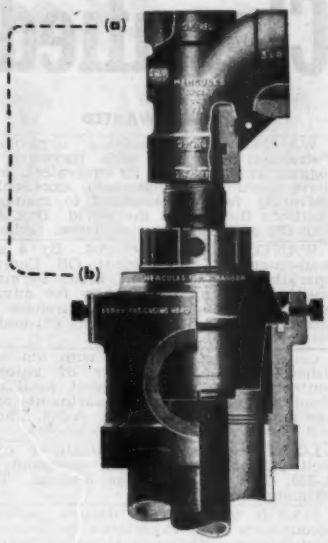
years he was chairman of Pure's refinery control board. Since 1942 he has been a consultant. Except for 1 year Dr. Wagner has been either secretary or chairman of the petroleum division, American Chemical Society, since 1929. In 1940 he received from National Association of Manufacturers the award of Modern Pioneer.

Dr. E. H. Boomer, chairman of the Petroleum and Natural Gas Conservation Board of Alberta, has been called to Ottawa for six weeks on war work for the Canadian Government.

Charles H. Pishny, of Cummins, Berger & Pishny, Fort Worth, was elected chairman of the North Texas section, American Institute of Mining and Metallurgical Engineers, formed at a meeting in Dallas May 31. **Brad Mills,** executive secretary, American Association of Oil Well Drilling Contractors, Dallas, is vice chairman for Dallas; **Gordon Fisher,** Gulf Oil Corp., vice chairman for Fort Worth; **K. Bruce Davidson,** Humble Oil & Refining Co., vice chairman for Wichita Falls; **R. T. Bright,** Mercantile National Bank, Dallas, secretary-treasurer. Directors are **T. K. Knox,** Republic Natural Gas Co., Dallas; **George Card,** Stanolind Oil & Gas Co., Fort Worth; **Barney Fisher,** Las Texas Petroleum Co., Dallas; **P. P. Gregory,** Yates Pool Engineering Committee, Fort Worth, and **V. C. Perini, Jr.,** Merry Brothers & Perini, Abilene.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, Washington, D. C. Notice is hereby given that the SE¼ sec. 18, T. 28 S., R. 28 E., M.D.M., California, 160 acres within the known geologic structure of the Kern River Field, is offered to the responsible qualified bidder of the highest cash bonus per acre for lease under section 17 of the mineral leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226). Sealed bids will be received in the office of the Commissioner of the General Land Office, Interior Building, Washington 25, D. C., up to 12 noon, June 18, 1945. Each bidder must submit a certified check or cash for one-fifth of the amount bid, payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required by section 7 of Circular No. 1386. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a $5,000 corporate surety bond must be furnished by the successful bidder prior to the issuance of the lease. The deposits of the other bidders will be returned upon acceptance of the successful bid by the Secretary of the Interior. The envelopes should be plainly marked "Bid for lease in Kern River Field, California. Not to be opened before noon, June 18, 1945." No bid received after the time fixed herein for submitting bids will be considered. The successful bidder will be required to agree not to discriminate against any employee or applicant for employment because of race, creed, color or national origin and to require an identical provision to be included in all subcontracts. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Fred W. Johnson, Commissioner.



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CHIEF Design Engineer with old established valve manufacturer of automatic control equipment—permanent position as Head of Engineering Department—advise age and qualifications. Box A-548, The Oil and Gas Journal, Tulsa, Oklahoma.

LONG established manufacturer of oil well pumps requires field salesman. Box A-559, The Oil and Gas Journal, Tulsa, Oklahoma.

MAJOR oil company desires junior oil accountants with experience in production (distribution authorization) accounting; also pipe line accountant familiar with I. C. C. report making and procedures. Must have oil accounting experience. Reply box # 2819, Dallas, 1, Texas.

ESTIMATING ENGINEER: Major petroleum company in Chicago. Must have oil refining, operating, or construction experience. Box A-529, The Oil and Gas Journal, Tulsa, Oklahoma.

MAP DRAFTSMAN with some knowledge of oil field operations. Chicago location. State age, experience and salary expected and submit sample of lettering. Box A-553, The Oil and Gas Journal, Tulsa, Oklahoma.

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ENGINEER capable of designing line of Centrifugal Pumps for refinery application. This engineer is required by a long established pump manufacturer. Excellent opportunity for right man. State experience, age and salary desired. Write Box A-523, The Oil and Gas Journal, Tulsa, Oklahoma.

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GRADUATE GEOLOGIST and Registered Civil Engineer, Age 39, experienced in supervision, design, field and construction engineering desires responsible position. Available on short notice. Box A-530, The Oil and Gas Journal, Tulsa, Oklahoma.

MR. PRODUCER or Production Manager: Are you satisfied with your present production? Does it require excessive time on your part? Are the problems your wells present too much for inadequately trained personnel? If so, as a graduate engineer, 48, with fifteen years' experience successfully applying common sense and hard work to difficult wells I could be an asset to your organization. Box A-542, The Oil and Gas Journal, Tulsa, Oklahoma.

YOUNG Experienced College Graduate, Discharged Veteran, now Public Accountant. Available as accountant, office manager, executive's assistant. Box A-544, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT ENGINEER—Desires connection with oil company West Texas or New Mexico. Experience all types refinery instruments. Two years instrument supervision. Now with large eastern Refinery Engineering and Construction Company specifying and writing specifications for instruments on oil refineries. Age 35—Change desired for child's health. Box A-549, The Oil and Gas Journal, Tulsa, Okla.

MATERIAL MAN: Major oil company experience with thorough knowledge of the purchase, receipt, warehousing and accounting for refinery equipment desires position in Colorado or New Mexico. Box A-566, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIRE connections with a progressive concern. Experienced in Catalytic cracking, H F Alkylation, Isomerization, Thermal processes, Combination units and General Refining Procedure. Thoroughly trained in maintaining low operating cost. Have had foreign experience. Presently employed. Available on 30 days notice. Best of references furnished upon request. Box A-550, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

TAX ACCOUNTANT-COMPTROLLER AUDITOR-EXECUTIVE: Employed by firm of public accountants as senior staff member. Contemplating change, seeks position with progressive independent oil company. Broad experience all phases of executive, general office procedure, federal and state income taxes; all governmental and state reports pertaining to oil industry. P. O. Box 5871, Dallas, Texas.

WANT connection with manufacturer or supplier of oil field equipment. Prefer Texas territory. Have office available. Thirty years experience drilling and producing oil wells. Executive experience. Box A-561, The Oil and Gas Journal, Tulsa, Oklahoma.

A-1 SALES Engineer, proven record, heavy machinery, desires change, will go anywhere. Prefer Texas or Gulf Coast. Box A-555, The Oil and Gas Journal, Tulsa, Oklahoma.

ASSISTANT to Manager, Land and Lease Dept., Natural Gas Producing Company. Age 42, with 15 years field and office experience, desires similar position with Mid-Continent or Western Company. Box A-543, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Engine Service Man or Maintenance man; best references; have car. P. O. Box 772, Tulsa, Oklahoma.

GRADUATE Electrical and Radio Engineer; age 38, with 17 years experience, desires position with oil or gas company. Box A-572, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT man experienced in all types refinery instruments desires connection with oil company in West or Southwest. Age 34, Available July 1st. Box A-573, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM and Chemical Engineer available; nineteen years experience chief-chemist and chief-operator natural gasoline plants; stillman alkylation and isomerization; process engineer recycling; field engineer potential tests, condensate evaluation and bottom hole pressure test on condensate wells. Box A-562, The Oil and Gas Journal, Tulsa, Oklahoma.

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